

LCD Projector

# **MultiSync VT440/VT540**

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User's Manual

**NEC**



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# **MultiSync VT440/VT540**

## **LCD Projector**

### **User's Manual**

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**English**



# IMPORTANT INFORMATION

## Precautions

Please read this manual carefully before using your NEC MultiSync VT440/VT540 Projector and keep the manual handy for future reference.

Your serial number is located under the name plate label on the right side of your MultiSync VT440/VT540. Record it here:

### CAUTION



To turn off main power, be sure to remove the plug from power outlet.  
The power outlet socket should be installed as near to the equipment as possible, and should be easily accessible.

### CAUTION



TO PREVENT SHOCK, DO NOT OPEN THE CABINET.  
NO USER-SERVICEABLE PARTS INSIDE.  
REFER SERVICING TO QUALIFIED NEC SERVICE PERSONNEL.



This symbol warns the user that uninsulated voltage within the unit may be sufficient to cause electrical shock. Therefore, it is dangerous to make any kind of contact with any part inside of the unit.



This symbol alerts the user that important information concerning the operation and maintenance of this unit has been provided. The information should be read carefully to avoid problems.

### WARNING

TO PREVENT FIRE OR SHOCK, DO NOT EXPOSE THIS UNIT TO RAIN OR MOISTURE.  
DO NOT USE THIS UNIT'S GROUNDED PLUG WITH AN EXTENSION CORD OR IN AN OUTLET UNLESS ALL THREE PRONGS CAN BE FULLY INSERTED.  
DO NOT OPEN THE CABINET. THERE ARE HIGH-VOLTAGE COMPONENTS INSIDE. ALL SERVICING MUST BE DONE BY QUALIFIED NEC SERVICE PERSONNEL.

## DOC Compliance Notice

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

### 3. GSGV Acoustic Noise Information Ordinance:

The sound pressure level is less than 70 dB (A) according to ISO 3744 or ISO 7779.

## RF Interference

### WARNING

The Federal Communications Commission does not allow any modifications or changes to the unit EXCEPT those specified by NEC Technologies in this manual. Failure to comply with this government regulation could void your right to operate this equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio / TV technician for help.

In UK, a BS approved power cable with moulded plug has a Black (five Amps) fuse installed for use with this equipment. If a power cable is not supplied with this equipment please contact your supplier.

- IBM is a registered trademark of International Business Machines Corporation.
- Macintosh and PowerBook are registered trademarks of Apple Computer, Inc.
- Other product and company names mentioned in this user's manual may be the trademarks of their respective holders.

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## Important Safeguards

These safety instructions are to ensure the long life of your projector and to prevent fire and shock. Please read them carefully and heed all warnings.

### Installation

1. For best results, use your projector in a darkened room.
2. Place the projector on a flat, level surface in a dry area away from dust and moisture.
3. Do not place your projector in direct sunlight, near heaters or heat radiating appliances.
4. Exposure to direct sunlight, smoke or steam can harm internal components.
5. Handle your projector carefully. Dropping or jarring can damage internal components.
6. Do not place heavy objects on top of the projector.
7. If you wish to have the projector installed on the ceiling:
  - a. **Do not attempt to install the projector yourself.**
  - b. The projector must be installed by qualified technicians in order to ensure proper operation and reduce the risk of bodily injury.
  - c. In addition, the ceiling must be strong enough to support the projector and the installation must be in accordance with any local building codes.
  - d. Please consult your dealer for more information.

### Power Supply

1. The projector is designed to operate on a power supply of 100-120 or 200-240 V 50/60 Hz AC. Ensure that your power supply fits this requirement before attempting to use your projector.
2. Handle the power cable carefully and avoid excessive bending. A damaged cord can cause electric shock or fire.
3. If the projector is not to be used for an extended period of time, disconnect the plug from the power outlet.

### Cleaning

1. Unplug the projector before cleaning.
2. Clean the cabinet periodically with a damp cloth. If heavily soiled, use a mild detergent. Never use strong detergents or solvents such as alcohol or thinner.
3. Use a blower or lens paper to clean the lens, and be careful not to scratch or mar the lens.

#### CAUTION

Do not unplug the power cable from the wall outlet under any one of the following circumstances. Doing so can cause damage to the projector:

- \* While the Hour Glass icon appears.
- \* While the message "Please wait a little." appears. This message will be displayed after the projector is turned off.
- \* Immediately after the power cable is plugged into the wall outlet (the POWER indicator has not changed to a steady amber glow).
- \* Immediately after the cooling fan stops working (The cooling fan continues to work for 30 seconds after the projector is turned off with the POWER button).
- \* While the POWER and the STATUS indicators are alternately flashing.

#### CAUTION

Do not put the projector on its side when the lamp is turned on. Doing so may cause damage to the projector.

#### CAUTION

Avoid displaying stationary images for a prolonged period of time.

Doing so can result in these images being temporarily sustained on the surface of the LCD panel.

If this should happen, continue to use your projector. The static background from previous images will disappear.

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## Lamp Replacement

- To replace the lamp, follow all instructions provided on page E-33.
- Be sure to replace the lamp when the message "The lamp has reached the end of its usable life. Please replace the lamp." appears. If you continue to use the lamp after the lamp has reached the end of its usable life, the lamp bulb may shatter, and pieces of glass may be scattered in the lamp case. Do not touch them as the pieces of glass may cause injury. If this happens, contact your NEC dealer for lamp replacement.
- Allow a minimum of 30 seconds to elapse after turning off the projector. Then disconnect the power cable and allow 60 minutes to cool the projector before replacing the lamp.

## Fire and Shock Precautions

1. Ensure that there is sufficient ventilation and that vents are unobstructed to prevent the build-up of heat inside your projector. Allow at least 3 inches (10 cm) of space between your projector and a wall.
  2. Prevent foreign objects such as paper clips and bits of paper from falling into your projector. Do not attempt to retrieve any objects that might fall into your projector. Do not insert any metal objects such as a wire or screwdriver into your projector. If something should fall into your projector, disconnect it immediately and have the object removed by a qualified NEC service personnel.
  3. Do not place any liquids on top of your projector.
- Do not look into the lens while the projector is on. Serious damage to your eyes could result.
  - Keep any items such as magnifying glass out of the light path of the projector. The light being projected from the lens is extensive, therefore any kind of abnormal objects that can redirect light coming out of the lens, can cause unpredictable outcome such as fire or injury to the eyes.
  - Do not cover the lens with the supplied lens cap or equivalent while the projector is on. Doing so can lead to melting of the cap and possibly burning your hands due to the heat emitted from the light output.

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# 1. INTRODUCTION

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## Introduction to the MultiSync VT440/VT540 Projector

This section introduces you to your new MultiSync VT440 (SVGA)/VT540 (XGA) Projector and describes the features and controls.

### Congratulations on Your Purchase of The MultiSync VT440/VT540 Projector

The MultiSync VT440/VT540 is one of the very best projectors available today. The MultiSync VT440/VT540 enables you to project precise images up to 300 inches across (measured diagonally) from your PC or Macintosh computer (desktop or notebook), VCR, DVD player, document camera, or even a laser disc player.

You can use the projector on a tabletop or cart, you can use the projector to project images from behind the screen, and the projector can be permanently mounted on a ceiling\*<sup>1</sup>. The remote control can be used wirelessly.

### Features you'll enjoy:

- Simple set up and operation.
- Front ventilation directs hot air away from your audience.
- A high-performance 160 watt NSH (130 watt in Eco mode) lamp. The lamp life can be extended up to 3000 hours by using the Eco mode.
- The supplied wireless remote control that operates the projector from any angle.
- Manual zoom control enables you to adjust the image between 25 (0.63 m) and 300 inches (7.6 m) (measured diagonally).
- Keystone correction allows you to correct trapezoidal distortion so that the image is square.
- You can choose between video modes depending on your source: "normal" for a typical picture, "natural" for true color reproduction.
- An image can be projected from in front or behind a screen, and the projector can even be installed on the ceiling.
- NEC Technologies' exclusive Advanced AccuBlend intelligent pixel blending technology - an extremely accurate image compression technology - offers a crisp image with SXGA (1280 x 1024) resolution\*<sup>3</sup>.
- Supports most IBM VGA, SVGA, XGA\*<sup>2</sup>, SXGA(with Advanced AccuBlend)\*<sup>3</sup>, Macintosh, component signal (YCbCr / YPbPr) or any other RGB signals within a horizontal frequency range of 15 to 100 kHz and a vertical frequency range of 50 to 117 Hz. This includes NTSC, PAL, PAL60, SECAM and NTSC4.43 standard video signals.

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**NOTE:** Composite video standards are as follows:

*NTSC:* U.S. TV standard for video in U.S. and Canada.

*PAL:* TV standard used in Western Europe.

*PAL60:* TV standard used for NTSC playback on PAL TVs.

*SECAM:* TV standard used in France and Eastern Europe.

*NTSC4.43:* TV standard used in Middle East countries.

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- The supplied remote control can be used without a cable.
- You can control the projector with a PC using the PC Control port.
- The contemporary cabinet design is light, compact, easy to carry, and complements any office, boardroom or auditorium.
- Eight pointers are available for your presentation.

**\*1 Do not attempt to mount the projector on a ceiling yourself.**

The projector must be installed by qualified technicians in order to ensure proper operation and reduce the risk of bodily injury. In addition, the ceiling must be strong enough to support the projector and the installation must be in accordance with any local building codes. Please consult your dealer for more information.

**\*2 An XGA image (1024 × 768) is converted into an 800 × 600 crisp image with NEC technology's Advanced AccuBlend on VT440.**

**\*3 An SXGA image (1280 × 1024) is converted into a 1024 × 768 crisp image with NEC technology's Advanced AccuBlend on VT540.**

## Getting Started

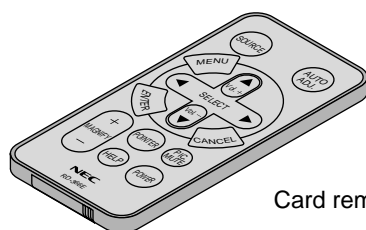
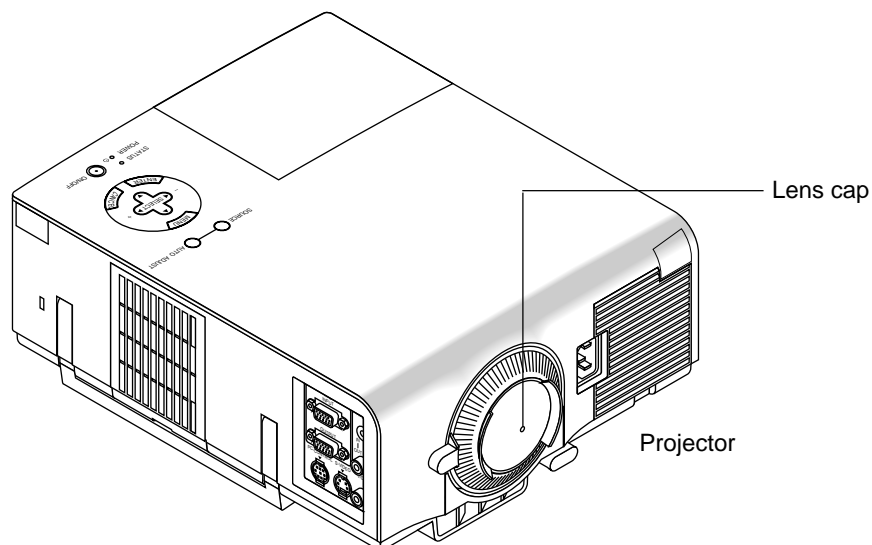
The fastest way to get started is to take your time and do everything right the first time. Take a few minutes now to review the user's manual. This may save you time later on. At the beginning of each section of the manual you'll find an overview. If the section doesn't apply, you can skip it.

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## What's in the Box?

Make sure your box contains everything listed. If any pieces are missing, contact your dealer.

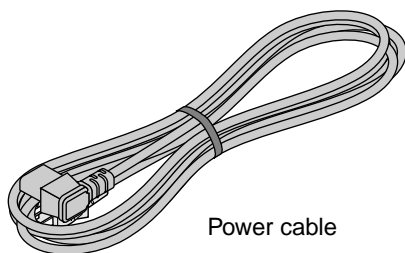
Please save the original box and packing materials if you ever need to ship your MultiSync VT440/VT540 Projector.



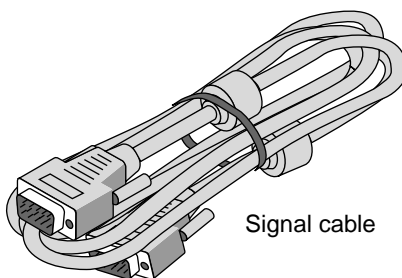
Card remote control



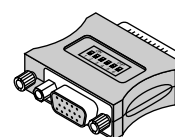
String and rivet



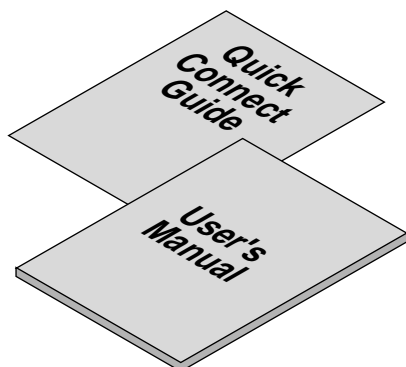
Power cable



Signal cable



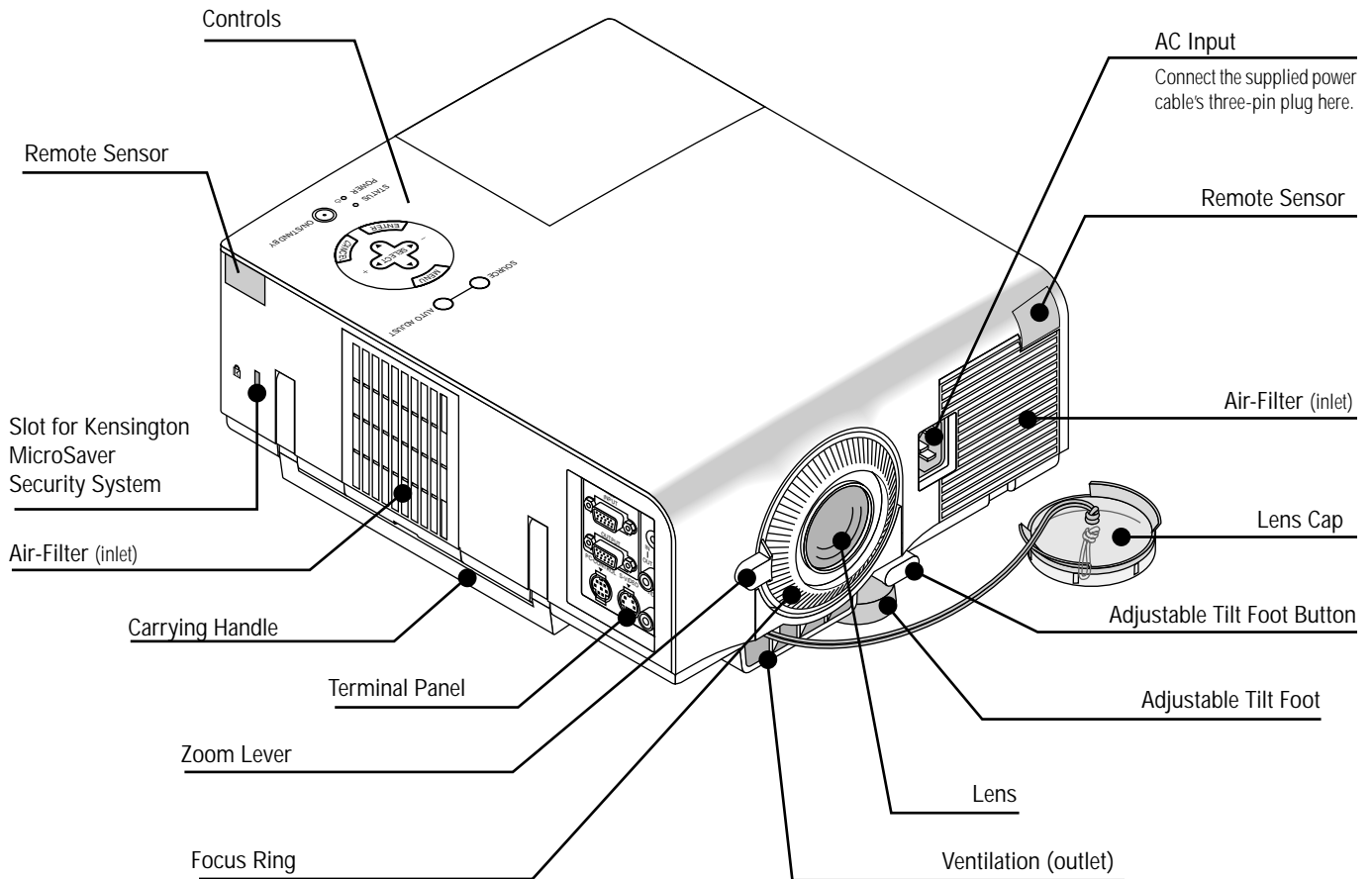
Pin adapter for Macintosh





## Getting to Know Your MultiSync VT440/VT540 Projector

### Front/ Side Features



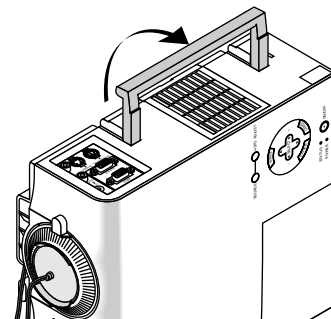
#### **NOTE:** Built-in Security Slot ( )

This security slot supports the MicroSaver® Security System. MicroSaver® is a registered trademark of Kensington Microware Inc. The logo is trademarked and owned by Kensington Microware Inc.

#### Carrying the Projector:

Raise the carrying handle up. Always carry your projector by the carrying handle.

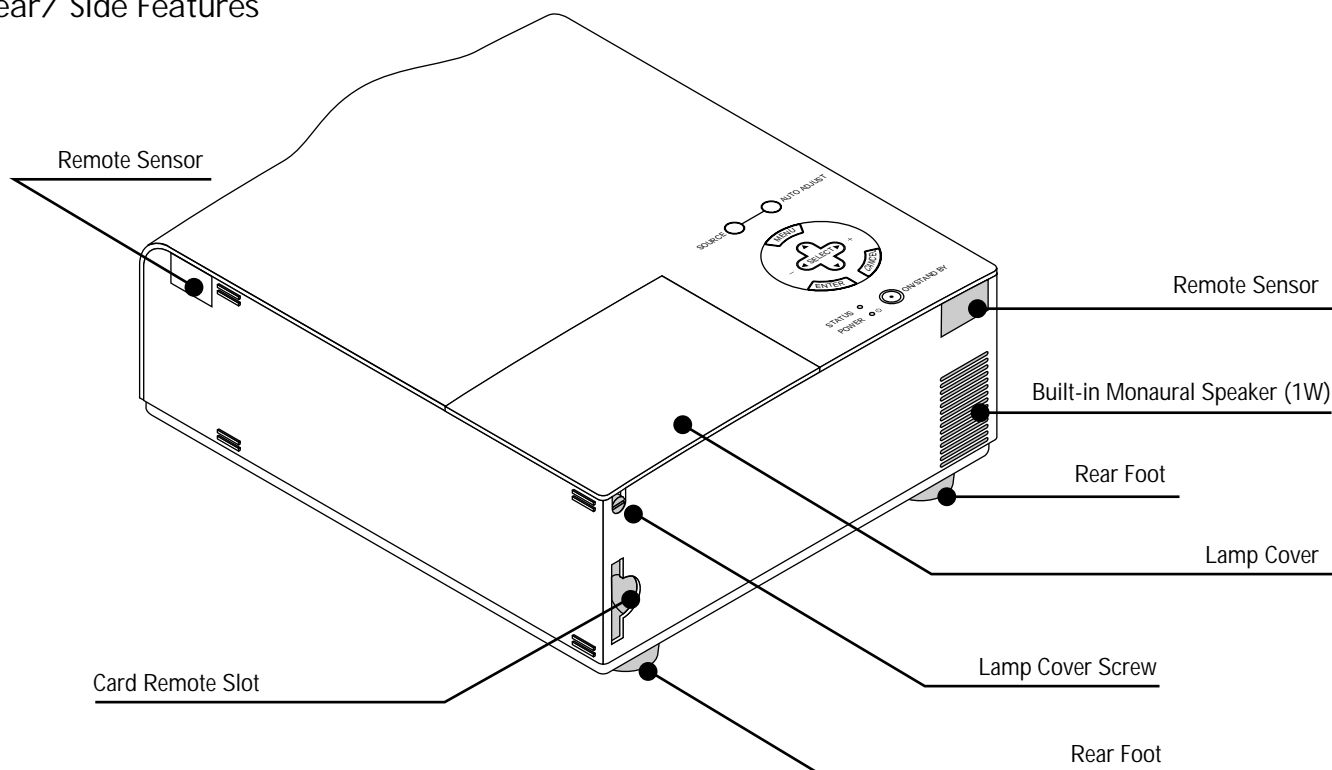
**NOTE:** When moving the projector or when it is not in use, cover the lens with the lens cap.



#### **CAUTION**

Do not put the projector on its side when the lamp is turned on. Doing so may cause damage to the projector.

## Rear/ Side Features

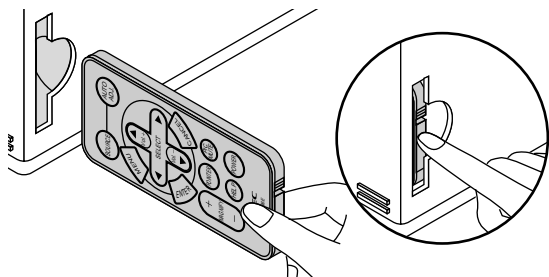


### Slot for Card Remote Control

The supplied card remote control can be stored in the cabinet.

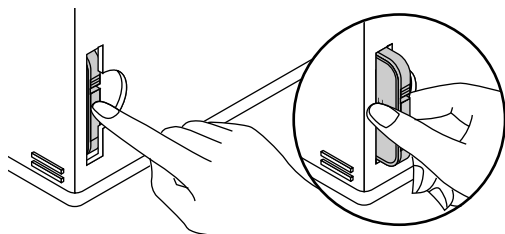
To store the card remote control:

1. Insert the card remote control **STRAIGHT** into the slot.
2. Push the card remote control until it is into place.



To pull out the card remote control:

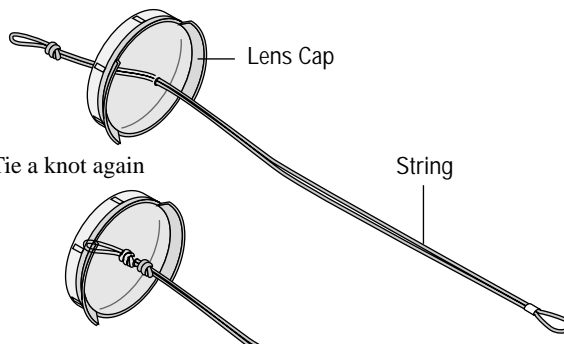
1. Push the bottom of the card remote control straight to eject the card remote control.
2. Pull out the card remote control.



**NOTE:** Do not push or pull the card remote control in a slanting direction. Unless you push the card remote control straight, you may not eject the card remote control. Should this happen, try pushing the card remote control straight again.

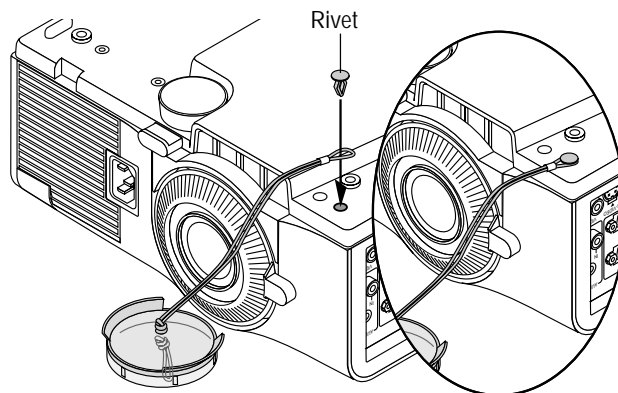
### Attaching the lens cap to the lens hood with the supplied string and rivet

1. Thread the string through the hole on the lens cap and then tie a knot in the string.

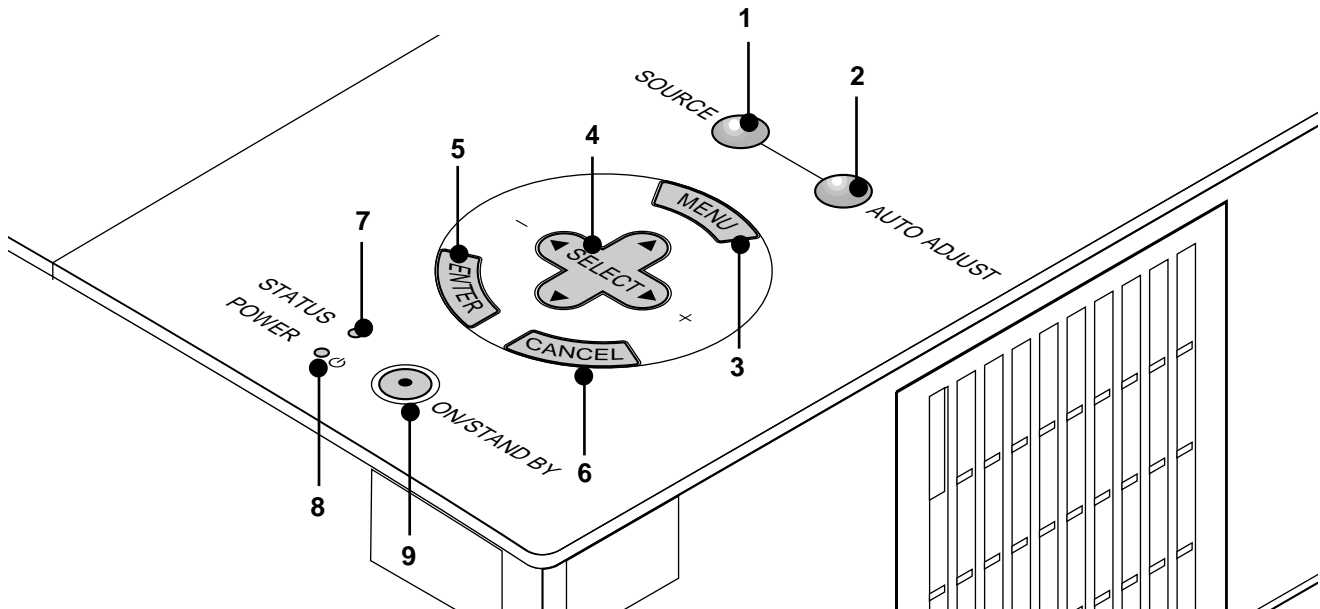


2. Tie a knot again

3. Use the rivet to attach the string to the bottom of the lens hood.



## Top Features



### 1 Source Button

Use this button to select a video source such as a PC, VCR or DVD player.

### 2 Auto Adjust Button

Use this button to adjust Position-H/V and Pixel Clock/Phase for an optimal picture. Some signals may not be displayed correctly or take time to switch between sources.

### 3 Menu Button

Displays the menu.

### 4 Select (▲▼◀▶) / Volume (+) (-) Buttons

▲▼: Use these buttons to select the menu of the item you wish to adjust.

◀▶: Use these buttons to change the level of a selected menu item.

A press of the ▶ button executes the selection. When no menus appear, these ▲▼ buttons work as a volume control.

When the pointer is displayed, these ◀▶ ▲▼ buttons move the pointer.

### 5 Enter Button

Executes your menu selection and activates items selected from the menu.

### 6 Cancel Button

Press this button to exit the menu. Press this button to return the adjustments to the last condition while you are in the adjustment or setting menu.

### 7 Status Indicator

When this is lit red (orange in Eco mode) continually, it's warning you that the projection lamp has exceeded 2000 hours (up to 3000 hours in Eco mode) of service. After this light appears, it is advisable to replace the projection lamp as soon as possible. (See page E-33). In addition the message **"The lamp has reached the end of its usable life. Please replace the lamp."** appears continually until the lamp is replaced.

If this light blinks red rapidly, it indicates that the lamp cover or filter cover is not attached properly or the projector is overheated. See the Power / Status Light Messages on page E-35 for more details.

### 8 Power Indicator (⬢)

When this indicator is green, the projector is on; when the indicator is orange, it is in standby mode.

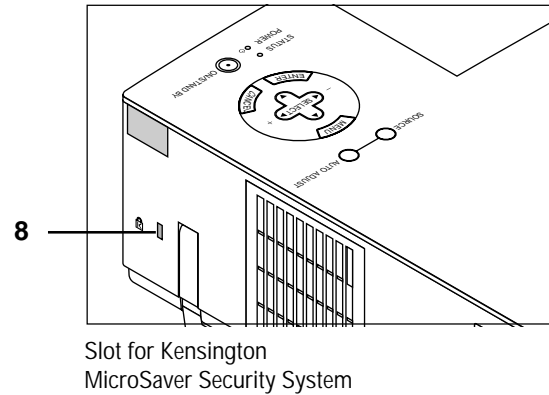
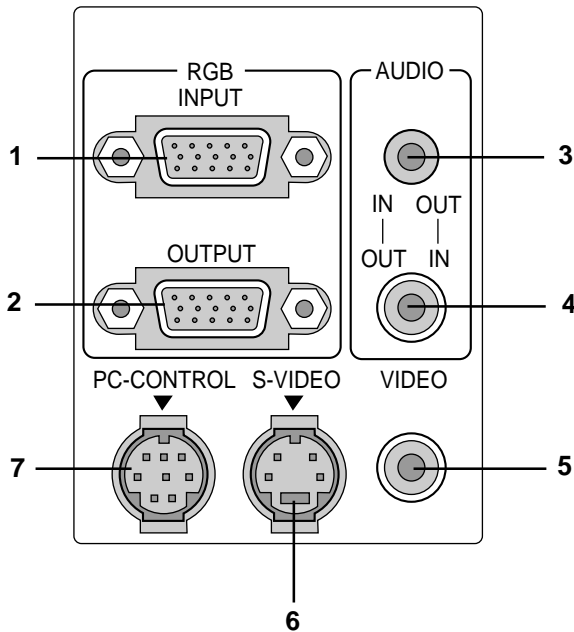
### 9 Power Button (ON / STAND BY)

Use this button to turn the power on and off when the power is supplied and the projector is in standby mode.

**NOTE:** To turn off the projector, press and hold this button for minimum of two seconds.

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## Terminal Panel Features



### 1. RGB Input Connector(Mini D-Sub 15 pin)

Connect your PC or other RGB equipment. Use the supplied signal cable to connect to a PC.

### 2. RGB Monitor Output Connector (Mini D-Sub 15 pin)

You can use this connector to loop your computer image to an external monitor from the RGB input source.

### 3. Audio Input / Output Mini Jack

This is where you connect audio output from your computer. Or connect additional external speakers here to listen to audio coming from your Video or S- Video input.

### 4. Audio Input / Output Connector (RCA)

This is where you connect audio output from a VCR, DVD player, or laser disc player. Or connect additional external speakers to listen to audio coming from your RGB source.

**NOTE:** Either connector 3 or 4 can be used for input or output, however they cannot both be used for input simultaneously. It can damage your equipment.

### 5. Video Input (RCA)

Connect a VCR, DVD player, laser disc player, or document camera here to project video.

### 6. S-Video Input Port (Mini DIN 4 Pin)

Connect the S-Video input from an external source like a VCR.

### 7. PC Control Port (Mini DIN 8 Pin)

Use this port to connect your PC to control your projector. This enables you to use your PC and serial communication protocol to control the projector. If you are writing your own program, typical PC control codes are on page E-40.

A cap is put on the port at the factory. Remove the cap when using the port.

### 8. Built-in Security Slot (K)

This security slot supports the MicroSaver<sup>®</sup> Security System. MicroSaver<sup>®</sup> is a registered trademark of Kensington Microware Inc. The logo is trademarked and owned by Kensington Microware Inc.

## Remote Control Features

### 1 Source Button

Press to select a video source.

### 2 Auto Adjust Button

Use this button to adjust Position-H/V and Pixel Clock/Phase for an optimal picture. Some signals may not be displayed correctly, or in some cases it may take some time for a source to switch between sources.

### 3 Menu Button

Displays the menu.

### 4 Select (▲▼◀▶) / Volume (+) (-) Buttons

▲▼: Use these buttons to select the menu of the item you wish to adjust.

◀▶: Use these buttons to change the level of a selected menu item.

A press of the ▶ button executes the selection. When no menus appear, these ▲▼ buttons work as a volume control.

When the pointer is displayed, these ◀▶ ▲▼ buttons move the pointer.

### 5 Enter Button

Use this button to enter your menu selection.

### 6 Cancel Button

Press this button to exit “Menus”. Press this button to return the adjustments to the last condition while you are in the adjustment or setting menu.

### 7 Magnify Button

Use the (+) or (-) button to adjust the image size up to 400%. When the Pointer is displayed, the magnified image is displayed at the center of the Pointer. When the Pointer is not displayed, the magnified image is displayed at the center of the screen.

When the image is magnified, the pointer is changed to the magnifying icon.

### 8 Pointer Button

Press this button to display one of the eight pointers; press again to hide the pointer. You can move your pointer icon to the area you want on the screen using the Select button.

### 9 Picture Mute Button

This button turns off the image and sound for a short period of time. Press again to restore the image and sound.

### 10 Help Button

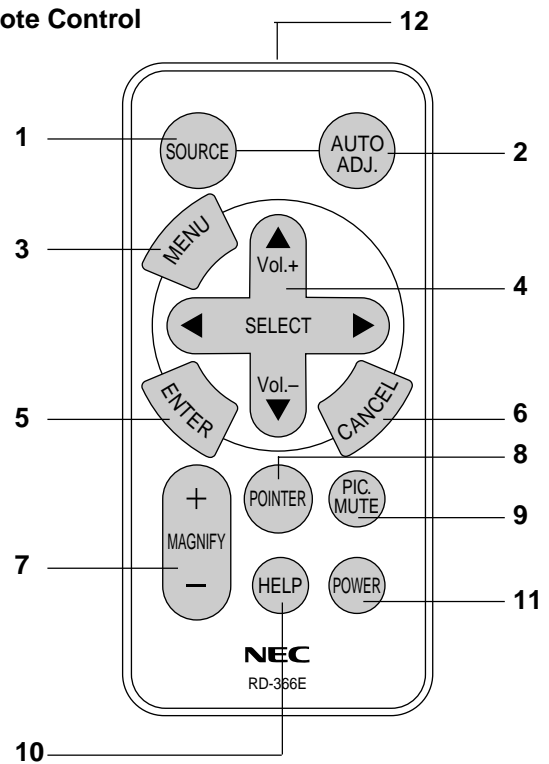
Provides information about operation and adjustment procedures or the set information for the current menu or adjustment during menu operation. This also displays information how to use the Help.

### 11 Power Button

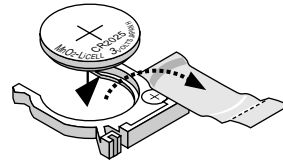
If power is applied, you can use this button to turn your projector on and off.

**NOTE:** To turn off the projector, press and hold the POWER button for a minimum of two seconds.

## Remote Control



**NOTE:** Remove the transparent insulation tape before use. See page E-34 for battery installation.



## 12 Infrared Transmitter

Direct the remote control toward the remote sensor on the projector cabinet.

## Remote Control Precautions

- Handle the remote control carefully.
- If the remote control gets wet, wipe it dry immediately.
- Avoid excessive heat and humidity.
- Do not place the battery upside down.

**NOTE:** Before you use the card remote control for the first time, be sure to remove the insulation tape from the card remote control.

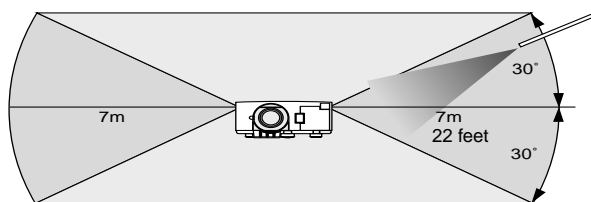
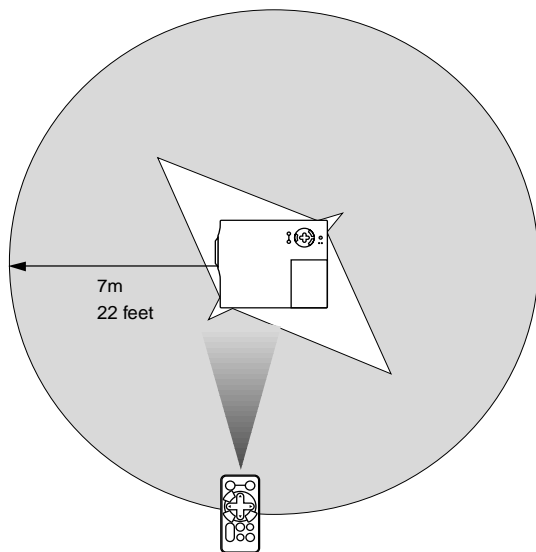
\* Keep the coin cell battery out of reach of children so as not to allow them to swallow the cell battery.

## CAUTION:

Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to your local regulations.

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## Operating Range



## 2. INSTALLATION

This section describes how to set up your MultiSync VT440/VT540 projector and how to connect video and audio sources.

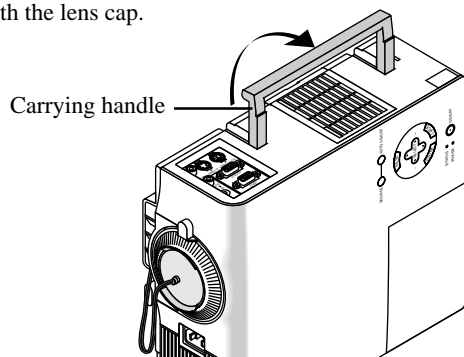
### Setting up Your Projector

Your MultiSync VT440/VT540 Projector is simple to set up and use. But before you get started, you must first:

1. Determine the image size.
2. Set up a screen or select a non-glossy white wall onto which you can project your image.

**Carrying the Projector:** Always carry your projector by the handle. Ensure that the power cable and any other cables connecting to video sources are disconnected before moving the projector.

When moving the projector or when it is not in use, cover the lens with the lens cap.



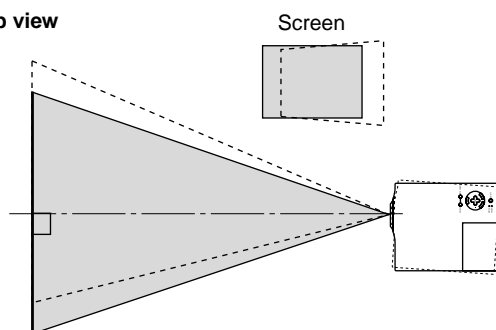
### Selecting a Location

The further your projector is from the screen or wall, the larger the image. The minimum size the image can be is approximately 25" (0.64 m) measured diagonally when the projector is roughly 4 feet (1.2 m) from the wall or screen. The largest the image can be is 300" (7.6 m) when the projector is about 39.3 feet (12.0 m) from the wall or screen.

### Using a Tabletop or Cart

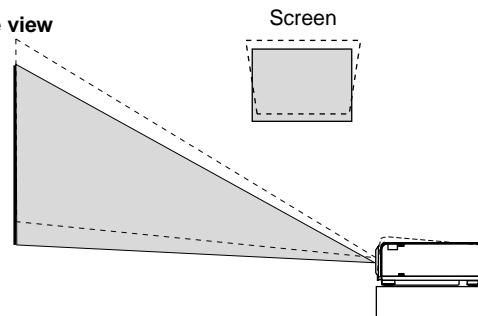
1. Place your projector on a flat level surface at the optimal distance from the screen or wall so you realize the size image you want. (Avoid having bright room lighting or sun light directly on the screen or wall where you'll be projecting the image.)
2. Connect the power cable, remove the lens cap and turn the projector on. (If no input signal is available, the projector will display a background image.)
3. Ensure that the projector is square to the screen.

Top view



4. Move the projector left or right to center the image horizontally on the screen.
5. To center the image vertically, lift the front edge of the projector and press the One-Touch Tilt button on the front side of the projector to release the Front Adjustable foot.

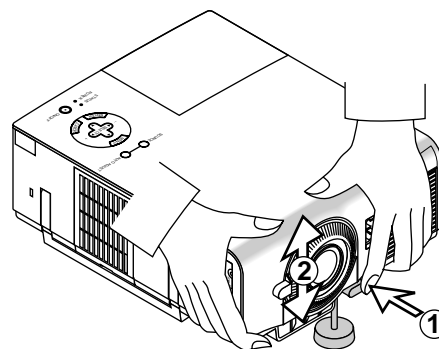
Side view



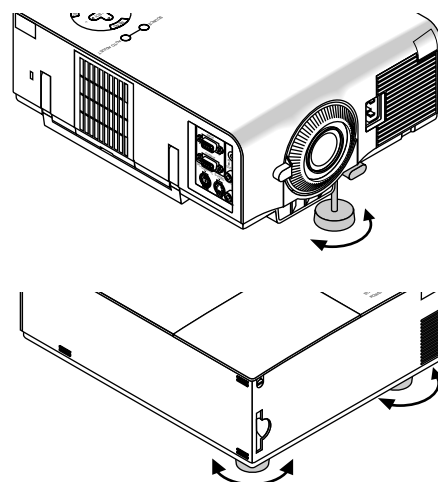
(There is approximately 10 degrees of up and down adjustment for the front of the projector.)

### Adjusting the Tilt Foot

- 1) Press and hold the Tilt button on the front of the projector.
- 2) Lift the front edge of the projector to the height you want, and release the button to lock the Adjustable Tilt Foot.

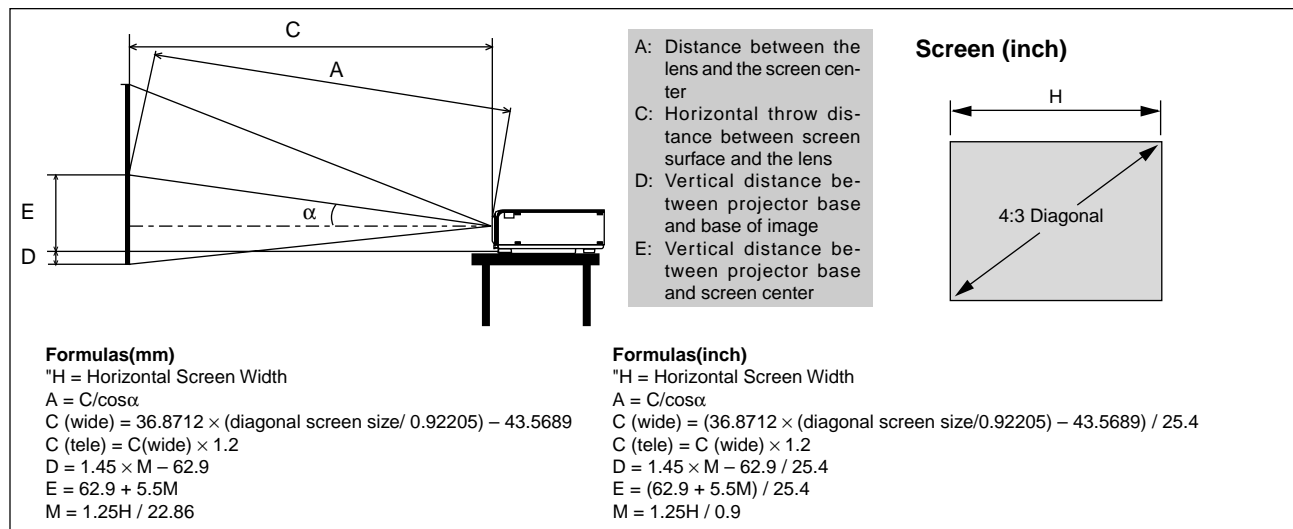


To fine-tune the image's position vertically on the screen, rotate the foot. Each of the rear feet height can be changed up to 0.6" (4mm).



6. If the projected image does not appear square to the screen then use keystone correction for proper adjustment.
7. Adjust the size of the image using the Zoom ring on the lens.

## Distance Chart



## Zoom Lens (Wide)

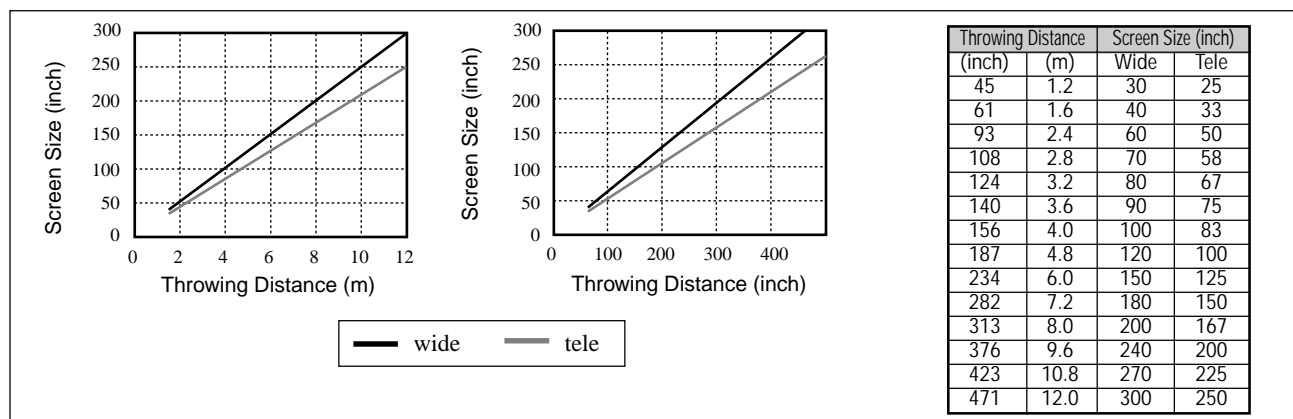
$\alpha$	degree	9.01	8.93	8.85	8.82	8.81	8.79	8.78	8.77	8.75	8.74	8.74	8.73	8.72	8.72
$\beta (= \sin \alpha)$		0.16	0.16	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
$\gamma (= \cos \alpha)$		0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Screen Size H-Width	inch	24	32	48	56	64	72	80	96	120	144	160	192	216	240
4:3 Diagonal	inch	30	40	60	70	80	90	100	120	150	180	200	240	270	300
A	mm	1171	1575	2384	2789	3193	3598	4002	4811	6025	7238	8047	9666	10879	12093
	inch	46	62	94	110	126	142	158	189	237	285	317	381	428	476
C	mm	1156	1556	2356	2756	3155	3555	3955	4755	5955	7154	7954	9554	10753	11953
	inch	46	61	93	108	124	140	156	187	234	282	313	376	423	471
D	mm	-15	2	34	50	66	82	98	130	179	227	259	324	372	420
	inch	-1	0	1	2	3	3	4	5	7	9	10	13	15	17
E	mm	246	307	430	491	552	613	674	796	980	1163	1285	1530	1713	1896
	inch	10	12	17	19	22	24	27	31	39	46	51	60	67	75

## Zoom Lens (Tele)

$\alpha$	degree	6.28	7.46	7.39	7.37	7.36	7.35	7.34	7.32	7.31	7.30	7.30	7.29	7.29	7.28
$\beta (= \sin \alpha)$		0.11	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
$\gamma (= \cos \alpha)$		0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Screen Size H-Width	inch	20	32	48	56	64	72	80	96	120	144	160	192	216	240
4:3 Diagonal	inch	25	40	60	70	80	90	100	120	150	180	200	240	270	300
A	mm	1396	1883	2851	3334	3818	4302	4785	5753	7204	8655	9623	11558	13009	14460
	inch	55	74	112	131	150	169	188	226	284	341	379	455	512	569
C	mm	1387	1867	2827	3307	3787	4266	4746	5706	7146	8585	9545	11464	12904	14344
	inch	55	74	111	130	149	168	187	225	281	338	376	451	508	565
D	mm	-23	2	34	50	66	82	98	130	179	227	259	324	372	420
	inch	-1	0	1	2	3	3	4	5	7	9	10	13	15	17
E	mm	216	307	430	491	552	613	674	796	980	1163	1285	1530	1713	1896
	inch	8	12	17	19	22	24	27	31	39	46	51	60	67	75

## Distance Chart

**NOTE:** Distances may vary +/-5%.





## Ceiling Installation

The diagram illustrates the geometry for ceiling installation. A projector is mounted on a ceiling, projecting an image onto a screen. The screen is represented by a vertical line. The projector is at a horizontal distance 'C' from the screen. The vertical distance from the projector to the screen center is 'B'. The vertical distance from the projector to the top of the image is 'F'. The horizontal distance from the screen center to the projector is 'A'. The angle between the projector's optical axis and the line to the screen center is 'α'.

**Formulas(mm)**

H" = Horizontal Screen Width (inch)

A = C/cosα

B = 94 + 5.5 × M

C (wide) = 36.8712 × (diagonal screen size/ 0.92205) – 43.5689

C (tele) = C(wide) × 1.2

F = 1.4516 × M – 94

M = 1.25H" / 22.86

**Formulas(inch)**

H" = Horizontal Screen Width

A = C/cosα

B = (94+5.5 × M) / 25.4

C (wide) = (36.8712 × (diagonal screen size/0.92205) – 43.5689) / 25.4

C (tele) = C (wide) × 1.2

F = 1.4516 × M – 94/25.4

M = 1.25H / 0.9

A: Distance between the lens and the screen center  
 B: Vertical distance between the top of the supplied ceiling mount and the screen center  
 C: Horizontal throw distance between screen surface and the lens  
 F: Vertical distance between projector base and top of image

## Zoom Lens (Wide)

α	degree	9.01	8.93	8.85	8.82	8.81	8.79	8.78	8.77	8.75	8.74	8.74	8.73	8.72	8.72
β (=sinα)		0.16	0.16	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
γ (=cosα)		0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Screen Size H-Width	inch	24	32	48	56	64	72	80	96	120	144	160	192	216	240
4:3 Diagonal	inch	30	40	60	70	80	90	100	120	150	180	200	240	270	300
A	mm	1171	1471	2242	2628	3013	3399	3785	4556	5713	6870	7641	9184	10341	11498
	inch	46	58	88	103	119	134	149	179	225	270	301	362	407	453
C	mm	1156	1556	2356	2756	3155	3555	3955	4755	5955	7154	7954	9554	10753	11953
	inch	46	61	93	108	124	140	156	187	234	282	313	376	423	471
B	mm	277	338	461	522	583	644	705	827	1011	1194	1316	1561	1744	1927
	inch	11	13	18	21	23	25	28	33	40	47	52	61	69	76
F	mm	-46	-29	3	19	35	51	67	100	148	196	229	293	341	390
	inch	-2	-1	0	1	1	2	3	4	6	8	9	12	13	15

## Zoom Lens (Tele)

α	degree	6.28	7.1	7.0	7.0	7.0	7.0	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9
β (=sinα)		0.11	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
γ (=cosα)		0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Screen Size H-Width	inch	20	32	48	56	64	72	80	96	120	144	160	192	216	240
4:3 Diagonal	inch	25	40	60	70	80	90	100	120	150	180	200	240	270	300
A	mm	1396	1902	2900	3399	3898	4397	4896	5893	7390	8887	9885	11881	13378	14875
	inch	55	75	114	134	153	173	193	232	291	350	389	468	527	586
C	mm	1387	1867	2827	3307	3787	4266	4746	5706	7146	8585	9545	11464	12904	14344
	inch	55	74	111	130	149	168	187	225	281	338	376	451	508	565
B	mm	247	338	461	522	583	644	705	827	1011	1194	1316	1561	1744	1927
	inch	10	13	18	21	23	25	28	33	40	47	52	61	69	76
F	mm	-54	-29	3	19	35	51	67	100	148	196	229	293	341	390
	inch	-2	-1	0	1	1	2	3	4	6	8	9	12	13	15

### WARNING

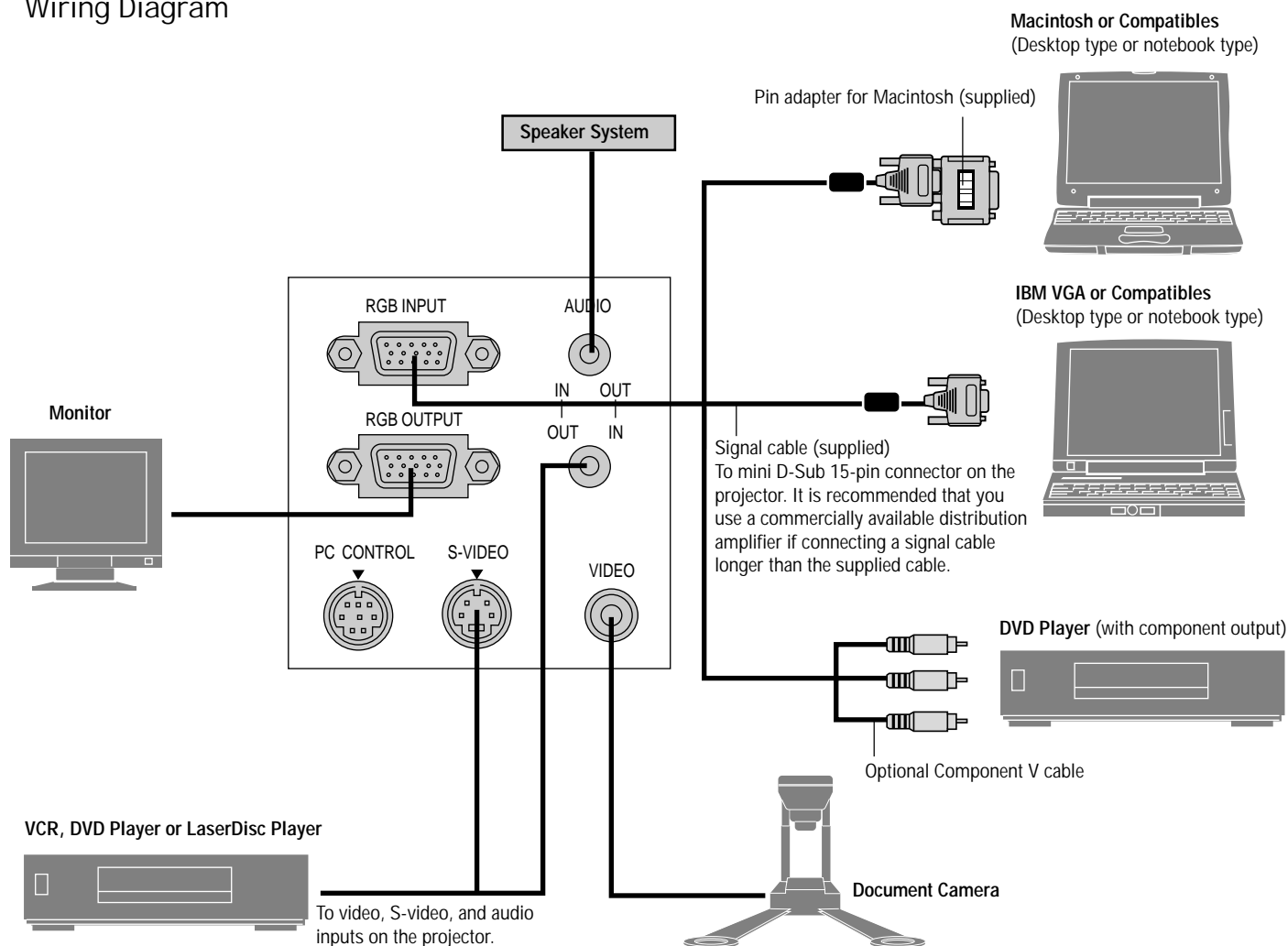
- Installing your projector on the ceiling must be done by a qualified technician. Contact your NEC dealer for more information.
- \* Do not attempt to install the projector yourself.
- Only use your projector on a solid, level surface. If the projector falls to the ground, you can be injured and the projector severely damaged.
- Do not use the projector where temperatures vary greatly. The projector must be used at temperatures between 32°F (0°C) and 95°F (35°C).
- Do not expose the projector to moisture, dust, or smoke. This will harm the screen image.
- Ensure that you have adequate ventilation around your projector so heat can dissipate. Do not cover the vents on the side or the front of the projector.

If your projector is mounted on the ceiling and your image is upside down, use the "Menu" and "Select" buttons on your projector cabinet or ▲▼ button on your remote control to correct the orientation. (See page E-31.)

### Reflecting the Image

Using a mirror to reflect your projector's image enables you to enjoy a much larger image. Contact your NEC dealer if you need a mirror. If you're using a mirror and your image is inverted, use the "Menu" and "Select" buttons on your projector cabinet or ▲▼ buttons on your remote control to correct the orientation. (See page E-31.)

## Wiring Diagram



**NOTE:** When using with a notebook PC, be sure to connect between the projector and the notebook PC before turning on the power to the notebook PC. In most cases signal cannot be output from RGB output unless the notebook PC is turned on after connecting with the projector.

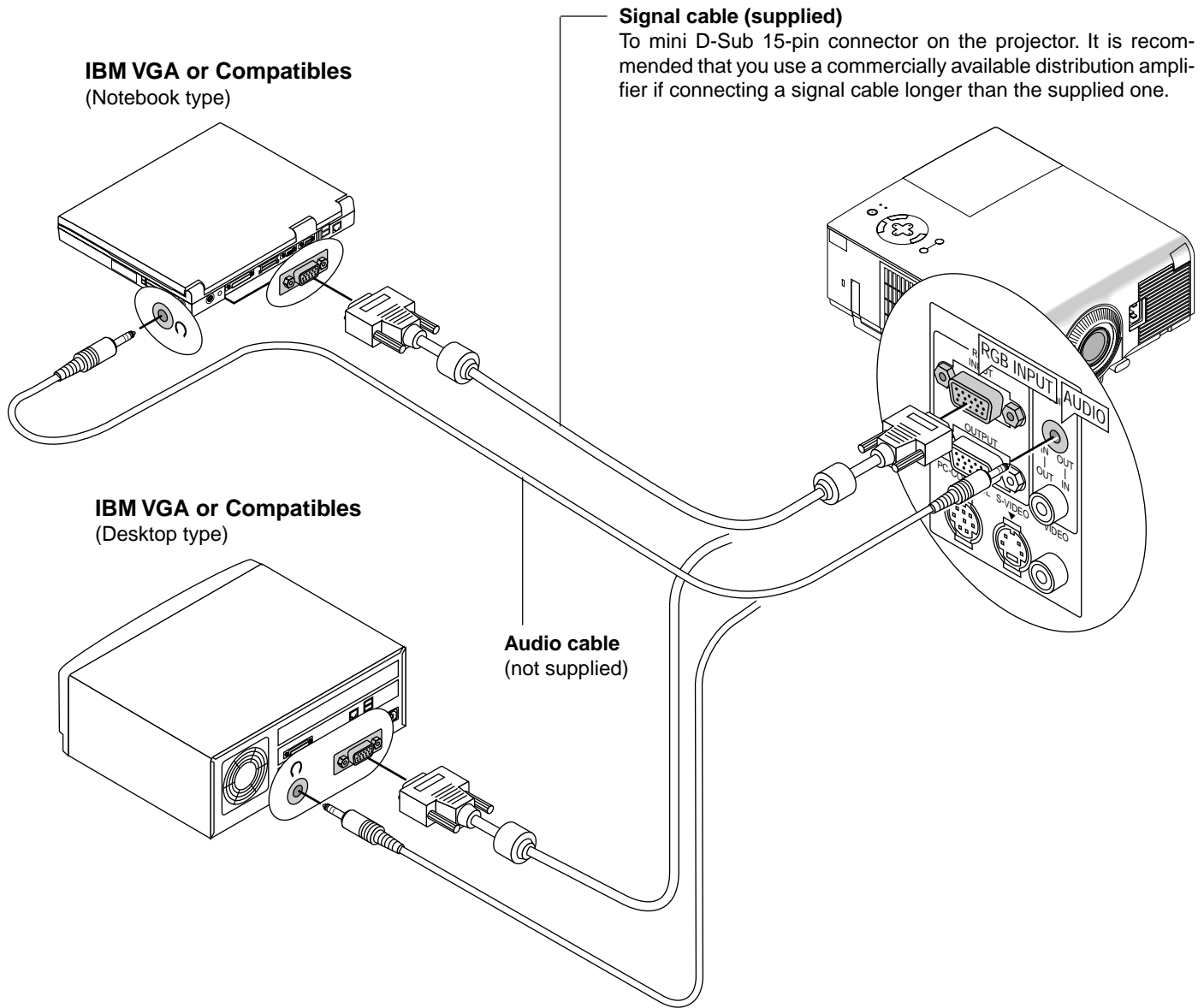
### NOTE:

- \* If the screen goes blank while using your remote control, it may be the result of the computer's screen-saver or power management software.
- \* If you accidentally hit the POWER button on the remote control, wait 30 seconds and then press the POWER button again to resume.

**NOTE:** If using video, S-video, or audio cables, the cables should be 3 m (9.8 feet) or shorter.

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## Connecting Your PC



Connecting your PC to your MultiSync VT440 (SVGA)/ VT540 (XGA) projector will enable you to project your computer's screen image for an impressive presentation.

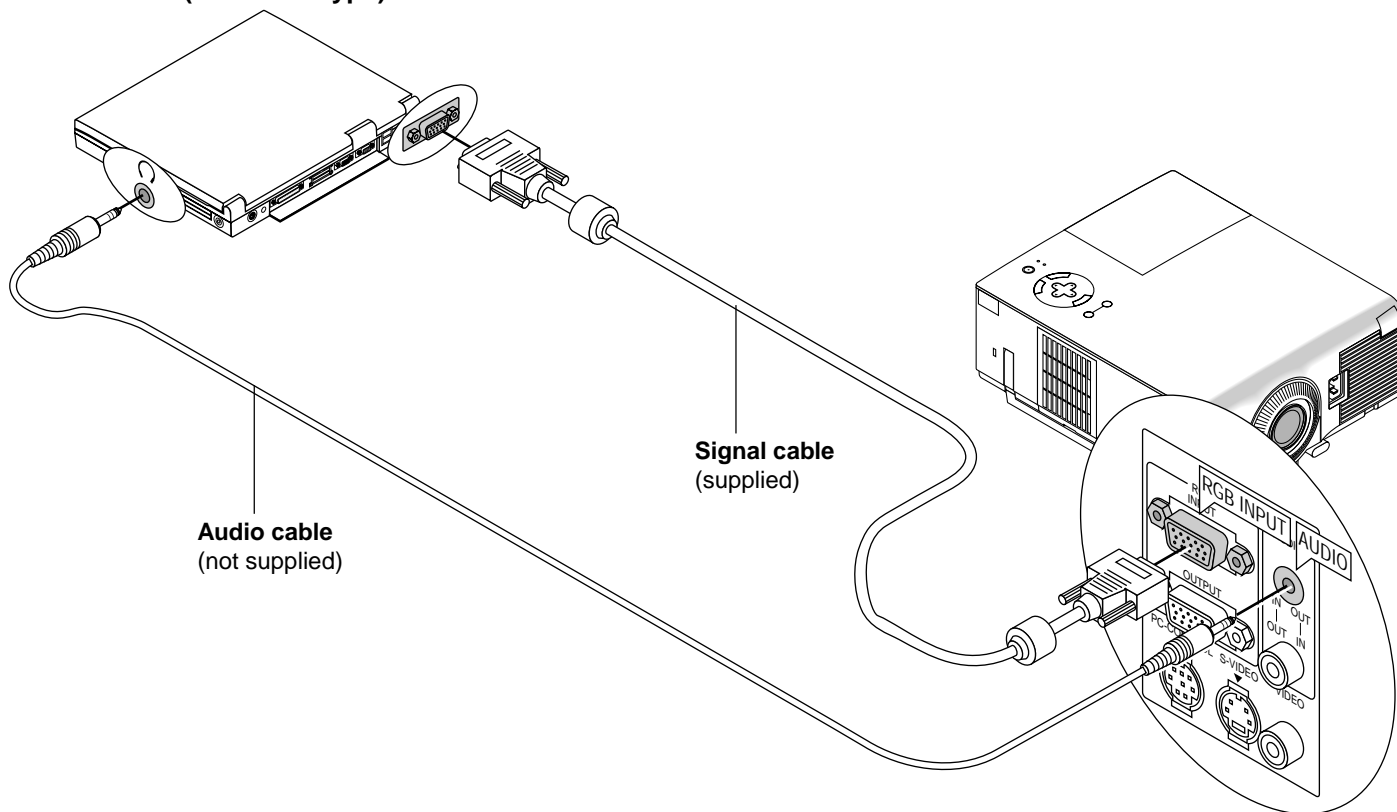
To connect to a PC, simply:

1. Turn off the power to your projector and computer.
2. Use the supplied signal cable to connect your PC to the projector.
3. Turn on the projector and the computer.
4. If the projector goes blank after a period of inactivity, it may be caused by a screen saver installed on the computer you've connected to the projector.

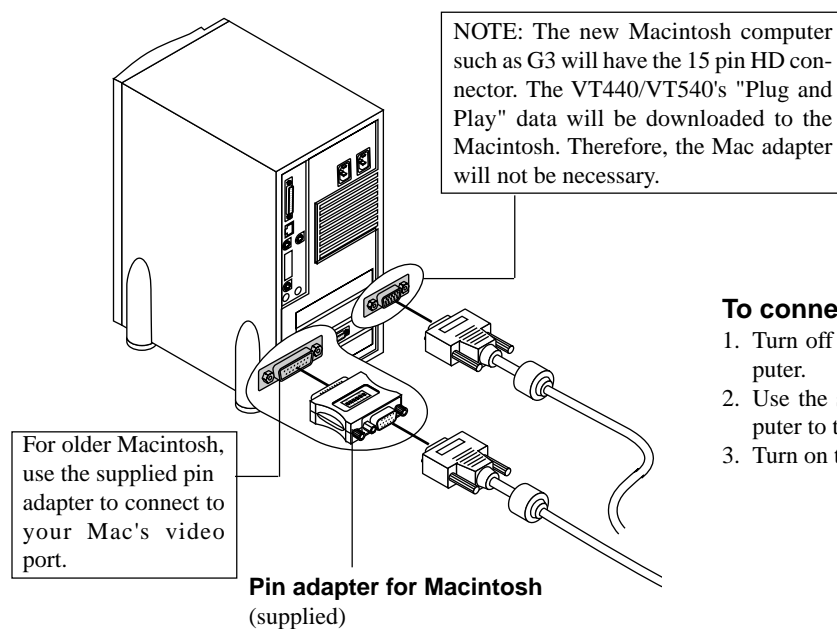
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## Connecting Your Macintosh Computer

### Macintosh (Notebook type)



### Macintosh (Desktop type)



#### To connect to a Macintosh, simply:

1. Turn off the power to your projector and your Macintosh computer.
2. Use the supplied signal cable to connect your Macintosh computer to the projector.
3. Turn on the projector and the Macintosh computer.

When using a Macintosh computer with the projector, set the DIP switches of the supplied pin adapter according to your resolution. After setting, restart your Macintosh computer.

See the following pages for setting of the DIP switches.

- When using with a Macintosh, SVGA(800×600 :VT440)/XGA(1024×768 : VT540) is recommended if your Macintosh supports this mode.
- When using with a Macintosh PowerBook, output may not be set to 800×600 unless “mirroring” is off on your PowerBook. Refer to owner’s manual supplied with your Macintosh computer for mirroring.

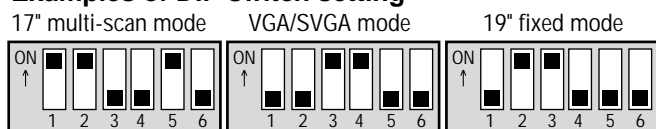
**NOTE:** A Video Adapter cable manufactured by Apple Computer is needed for a PowerBook which does not have a mini D-Sub 15-pin connector.

## Settings for Monitor Mode

Resolution \ Number of DIP switch	1	2	3	4	5	6
13" multi-scan mode /16"-13"	ON	ON			ON	ON
17" multi-scan mode /19"-13"	ON	ON			ON	
21" multi-scan mode /21"-13"	ON	ON				ON
13" fixed mode /640x480	ON	ON				
VGA/SVGA mode			ON	ON		
16" fixed mode /832x624		ON		ON		
19" fixed mode /1024x768		ON	ON			
21" fixed mode /1152x870	ON	ON	ON	ON		

**NOTE:** For settings other than display modes supported by your Macintosh and the projector, use of the DIP switch may bounce an image slightly or may display nothing. If this happens, set the DIP switch to the 13" fixed mode and then restart your Macintosh. After that, restore to a displayable mode and then restart the Macintosh again. Make sure that the projector and your Macintosh are connected with the pin adapter and the supplied signal cable (mini D-Sub 15-pin connector) and then restart your Macintosh.

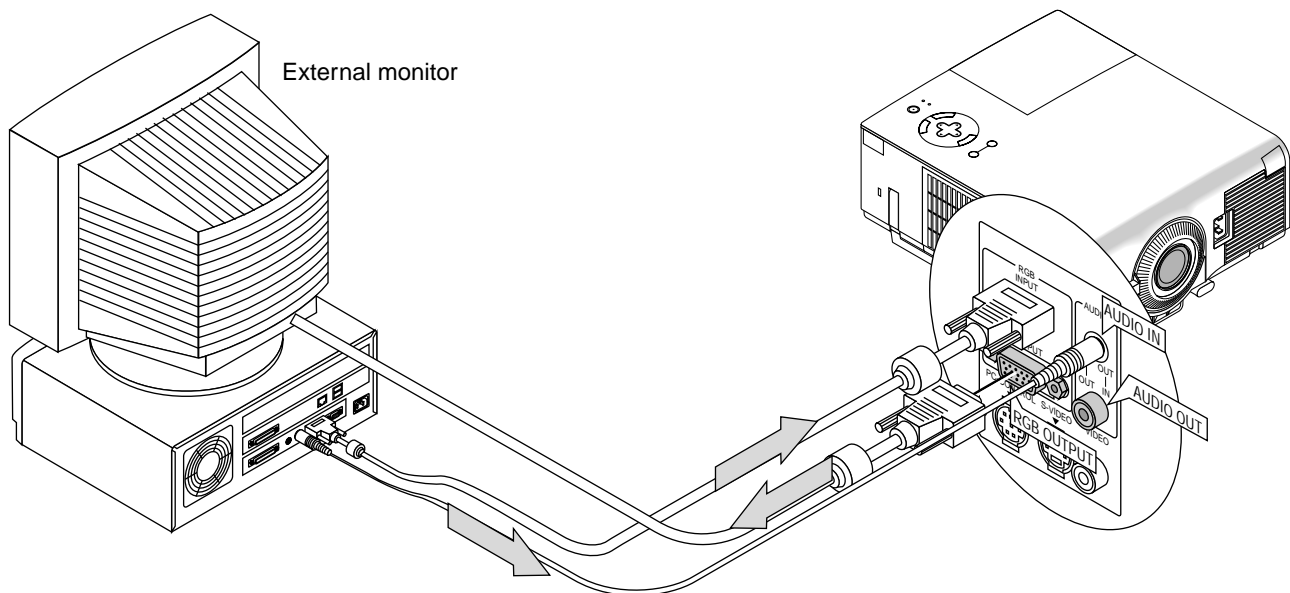
## Examples of DIP switch setting



**NOTE:** Refer to your computer’s owner’s manual for more information about your computer’s video output requirements and any special identification or configuring your projector’s image and monitor may require.

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## Connecting an External Monitor

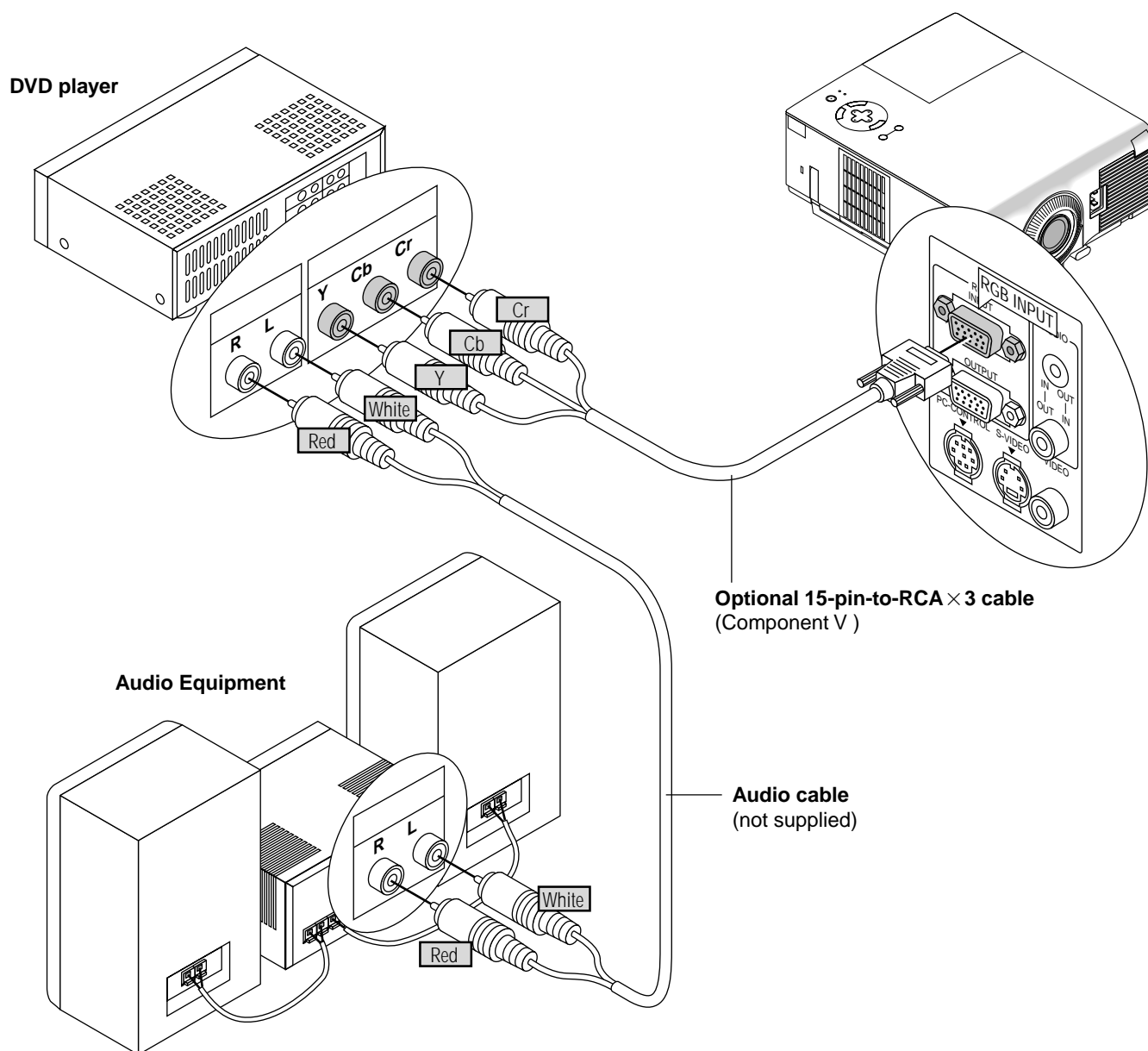


You can connect a separate, external monitor to your VT440/VT540 to simultaneously view on a monitor the image you're projecting. To do so:

1. Turn off the power to your projector, monitor and computer.
2. Use a 15-pin cable to connect your monitor to the RGB Monitor Output (Mini D-Sub 15 pin) connector on your projector.
3. Turn on the projector, monitor and the computer.

---

## Connecting Your DVD Player



You can connect your projector to a DVD player with component outputs or Video output. To do so, simply:

1. Turn off the power to your projector and DVD player.
2. If your DVD player has the component video (Y,Cb,Cr) output, use the optional 15-pin-to-RCA × 3 cable to connect your DVD player to the RGB INPUT connector on the projector.  
For a DVD player without component video (Y,Cb,Cr) outputs, use common RCA cables (not provided) to connect a composite VIDEO output of the DVD player to the Video Input of the projector.
3. Turn on the projector and DVD player.

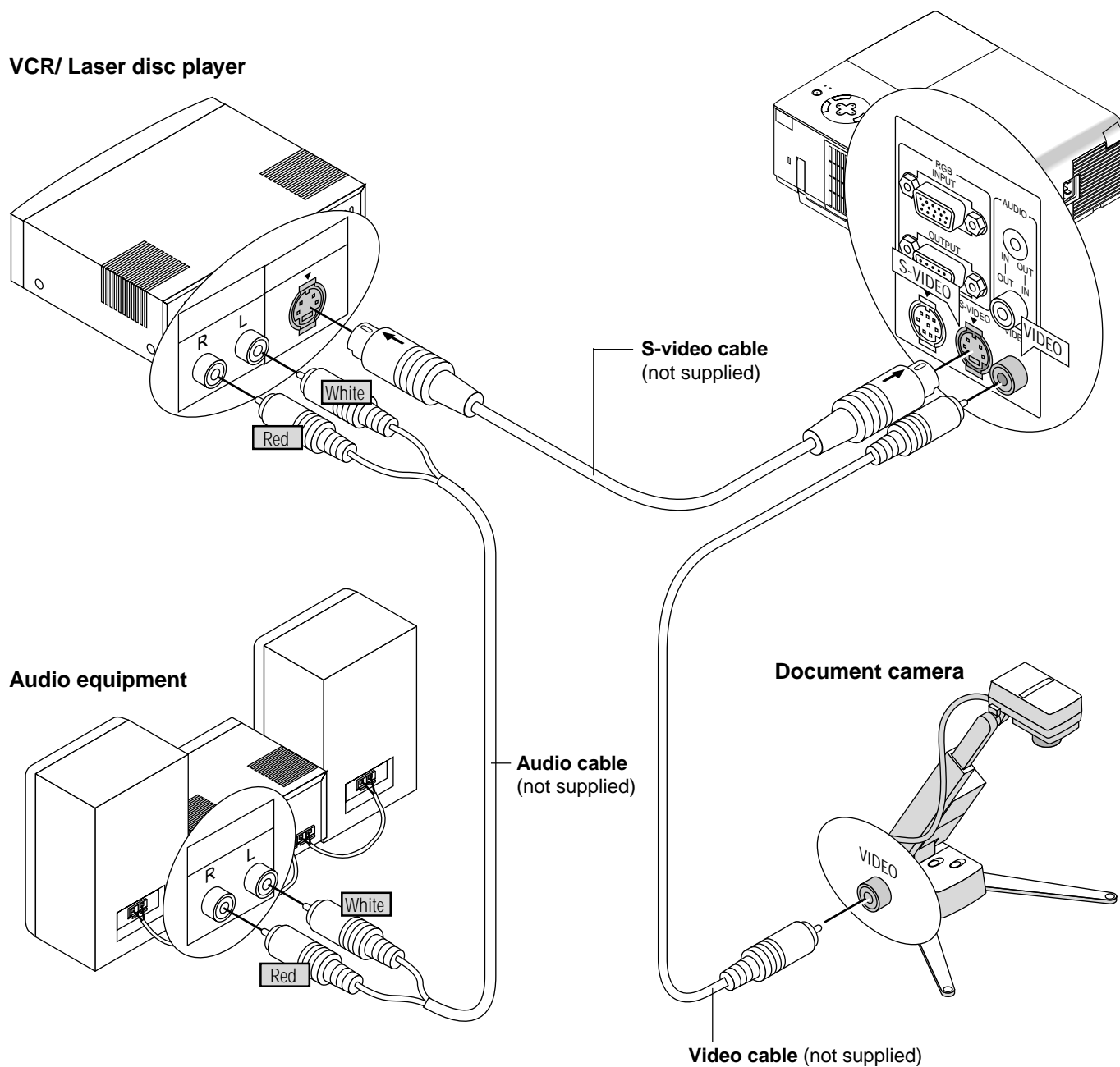
**NOTE:** Refer to your DVD player's owner's manual for more information about your DVD player's video output requirements.

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## Connecting Your VCR or Laser Disc Player

### VCR/ Laser disc player



Use common RCA cables (not provided) to connect your VCR, laser disc player or document camera to your projector.

To make these connections, simply:

1. Turn off the power to the projector and VCR, laser disc player or document camera.
2. Connect one end of your RCA cable to the video output connector on the back of your VCR or laser disc player, connect the other end to the Video input on your projector. Use an audio cable (not supplied) to connect the audio from your VCR or laser disc player to your audio equipment (if your VCR or laser disc player has this capability). Be careful to keep your right and left channel connections correct for stereo sound.
3. Turn on the projector and the VCR or laser disc player.

**NOTE:** Refer to your VCR or laser disc player owner's manual for more information about your equipment's video output requirements.

---



# 3. OPERATION

This section describes how to select a computer or video source, how to adjust the picture, and how to customize the menu or projector settings.

## General Controls

Before you turn on your projector, ensure that the computer or video source is turned on and that your lens cap is removed.

### 1. Turn on the Projector

Plug the supplied power cable in the wall outlet. The projector will go into its standby mode and the power indicator will glow orange.

Only after you press the “POWER” button on the projector cabinet or the remote control will the power indicator turn to green and the projector become ready to use.

**NOTE:** To turn the projector on by plugging in the power cable, use the menu and enable the “Auto Start” feature. (See page E-32.)

**NOTE:** Regardless of the lamp mode setting, the lamp always stays in High-Bright mode for 3 minutes after the projector is turned on. If you have selected the Eco mode, the STATUS indicator blinks green and the lamp will change to Eco mode in 3 minutes.

**NOTE:** Immediately after turning on the projector, screen flicker may occur. This is not a fault. Wait for 3 to 5 minutes until the lamp lighting is stabilized.

### 2. Select the Computer or Video Source

Press the Source button on the remote control or the projector cabinet to select “Video” (VCR, document camera, or laser disc player), S-Video” or “RGB” (computer or DVD with component output) to display the image.

Or press the “Menu” button on the remote control or the cabinet and use the menu to select your video source: “Video”, “S-Video” or “RGB”.

### 3. Adjust the Image Size and the Focus

Use the Zoom lever to adjust the image size, then use the Focus ring to obtain the best focus.

Use the “Magnify” button (+) or (-) on the remote control to make the image larger up to 400%.

### 4. Turning off the Projector

First press the “POWER” button on the projector cabinet or the remote control for a minimum of two seconds. The power indicator will glow orange. After the projector turns off, the cooling fans keep operating for 30 seconds.

Do not disconnect the power cable during this time. Then, unplug the power cable. The power indicator will go out.

## IMPORTANT:

- The projector should be unplugged if it will not to be used for an extended period.
- To turn off the image and sound briefly (five minutes or less), use the “Picture Mute” button instead of turning the projector off and on.
- The projector will display a black, blue image or logo if no input signal is present.
- Do not turn the projector off and then immediately back on. The projector needs to cool for 30 seconds before it can be restarted.

## CAUTION

Avoid displaying stationary images for a prolonged period of time.

Doing so can result in these images being temporarily sustained on the surface of the LCD panel.

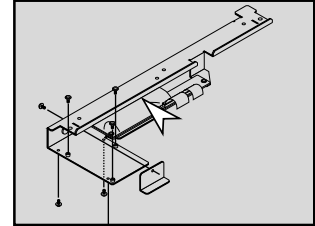
If this should happen, continue to use your projector. The static background from previous images will disappear.

## Enlarging and Moving a Picture

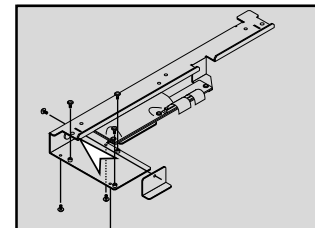
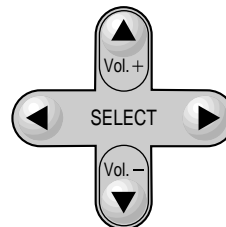
You can enlarge the area you want up to 400 percent.

To do so:

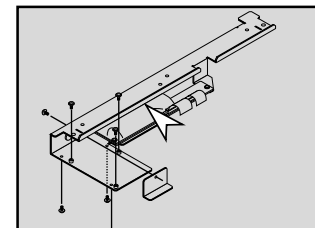
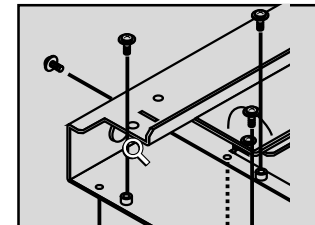
- 1) Press the POINTER button on the card remote control to display the pointer.



- 2) Move the pointer to the area you want to enlarge.



- 3) Adjust the image size up to 400 percent.



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## Using the Menus

**NOTE:** *An interlaced motion video image may be blurred while the menu is displayed.*

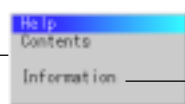
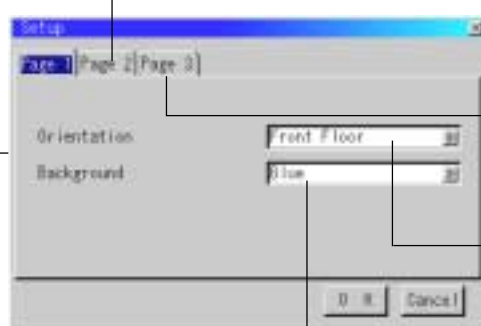
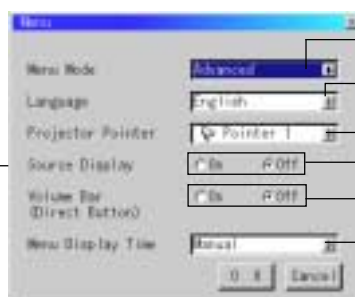
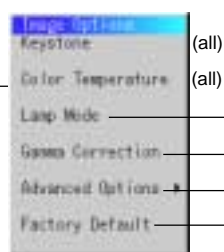
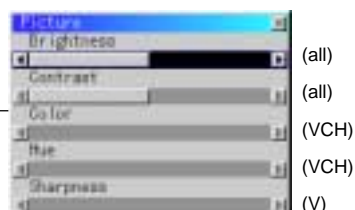
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1. Press the “Menu” button on the remote control or the projector cabinet to display the Main Menu.
2. Press the ▲▼ buttons on the remote control or the projector cabinet to highlight the menu for the item you want to adjust or set.
3. Press the ► button or the “Enter” button on the remote control or the projector cabinet to select a submenu or item.
4. Adjust the level or turn the selected item on or off by using “Select” ◀ or ▶ buttons on the remote control or the projector cabinet. The on-screen slide bar will show you the amount of increase or decrease.
5. The change is stored until you adjust it again.  
ENTER: Stores the setting or adjustments.  
CANCEL: Return to the previous screen without storing settings or adjustments.
6. Repeat steps 2-5 to adjust an additional item, or press “Cancel” on the remote control or the projector cabinet to quit the menu display.

## MENU Tree

### Basic/ Advanced Menu

### Sub Menu



### Items

High-Bright/ Eco (all)

Normal/ Natural1/ Natural2 (all)

Aspect Ratio	Normal/ Zoom/ Wide Zoom/ Cinema	(VCH)
Noise Reduction	Off/ Low/ Medium/ High	(VCH)
Color Matrix	HDTV/ SDTV/ B-Y/R-Y, Cb/Cr, Pb/Pr	(CH)
White Balance	Brightness R/G/B, Contrast R/G/B	(all)
Auto Adjust	On/ Off	(R)
Position/ Clock	Horizontal/ Vertical/ Clock/ Phase	(RH)/(R)
Resolution	Auto/ Native	(R)

All Data/ Current Signal

Menu Mode Basic/ Advanced

English/ German/ French/ Italian/ Spanish/ Swedish/ Japanese

Pointer 1-8

Source Display On/ Off

Volume Bar (Direct Button) On/ Off

Menu Display Time Manual/ Auto 3sec/ Auto 10sec/ Auto 30sec

Signal Select	
RGB	Auto/ RGB/ Component
VIDEO/ S-VIDEO	Auto/ NTSC3.58/ NTSC4.43/ PAL/ PAL60/ SECAM

Auto Start On/ Off

Power Management On/ Off

Power Off Confirmation On/ Off

Keystone Save On/ Off

Clear Lamp Hour Meter

Orientation Front/ Floor, Rear/Ceiling, Rear/Floor, Front/Ceiling

Background Blue/ Black/ Logo

Source Name	Resolution
Input Terminal	Aspect Ratio
Horizontal Frequency	Gamma Correction
Vertical Frequency	Noise Reduction
Sync Polarity	Color Matrix
Signal Type	Matrix Type
Video Type	Lamp Remaining Time (%)
Sync Type	Lamp Hour Meter (H)
Interface	Projector Usage

### NOTE:

Adjustable sources

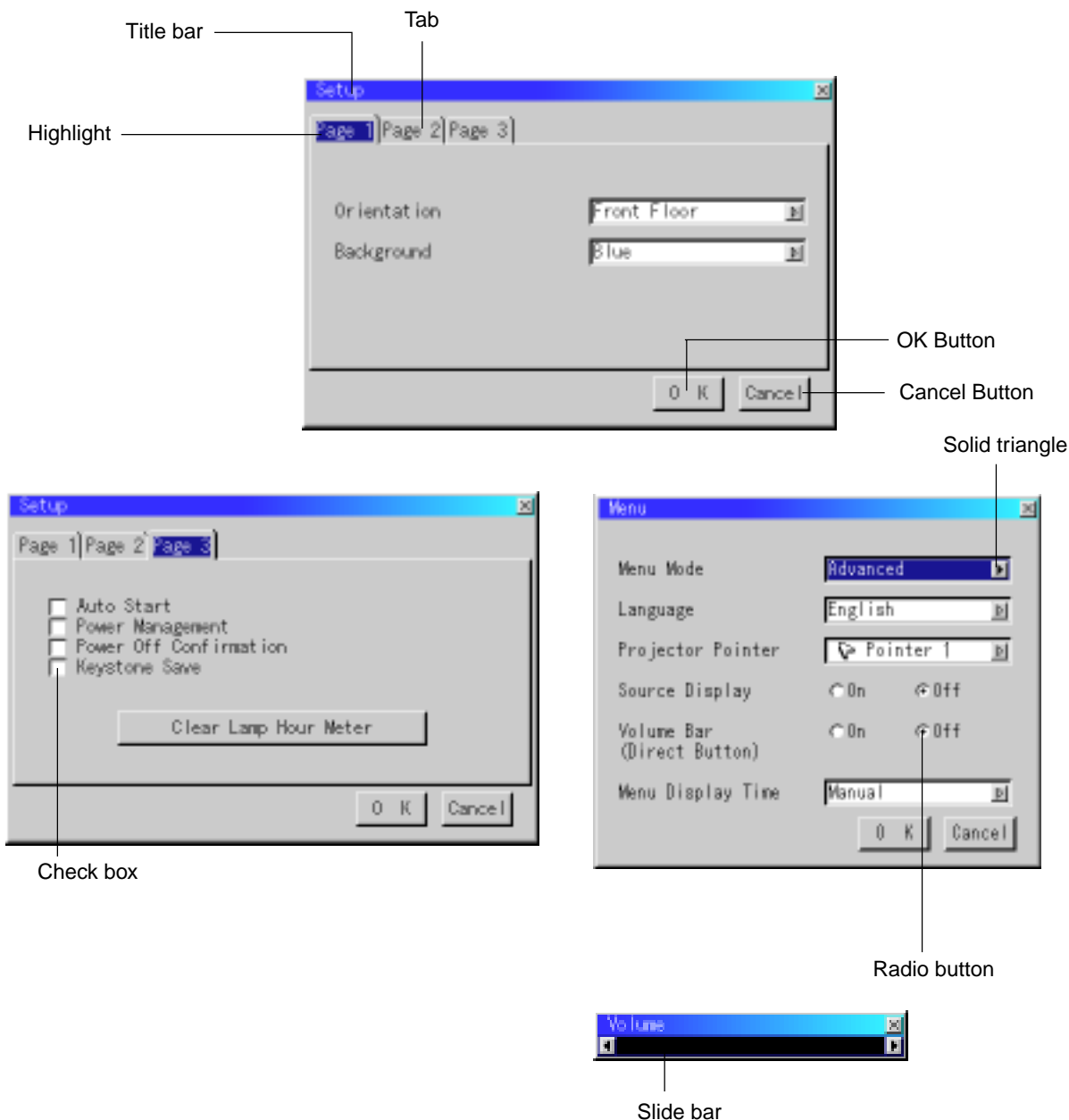
R=RGB V=Video/S-Video

C=Component H=HDTV

All=All sources

---

## Menu Elements



.....

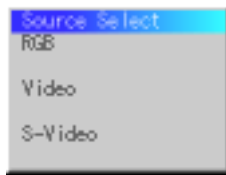
Menu windows or dialog boxes typically have the following elements:

- Title bar:** Indicates the menu title.
  - Highlight:** Indicates the selected menu or item.
  - Solid triangle:** Indicates further choices are available. A highlighted triangle indicates the item is active.
  - Tab:** Indicates a group of features in a dialog box. Selecting on any tab brings its page to the front.
  - Radio button:** Use this round button to select an option in a dialog box.
  - Check box:** Place a checkmark in the square box to turn the option On.
  - Slide bar:** Indicates settings or the direction of adjustment.
  - OK button:** Press to confirm your setting. You will return to the previous menu.
  - Cancel button:** Press to cancel your setting. You will return to the previous menu.
-

---

## Menu Descriptions & Functions

### Source Select



Enables you to select a video source such as a VCR, DVD player, laser disc player, computer or document camera depending on what is connected to your inputs. Press the “Select” button on the projector cabinet or ▲▼ buttons on your remote control to highlight the menu for the item you want to adjust.

### RGB

Selects the computer connected to your RGB or component signal.

**NOTE:** An optional component cable (Component V cable) is needed for a component signal.

---

### Video

Selects what is connected to your Video input-VCR, laser disc player, DVD player or document camera.

### S-Video

Selects what is connected to your S-Video input-VCR, DVD player, or laser disc player.

**NOTE:** A frame may freeze for a brief period of time when a video is played back in fast-forward or fast-rewind with a Video or S-Video source.

---

### Picture



Provides access to controls for your image. Use the “Select” button on the projector cabinet or the remote control to highlight the menu for the item you want to adjust.

### Brightness

Adjusts the brightness level or the back raster intensity.

### Contrast

Adjusts the intensity of the image according to the incoming signal.

### Color

Increases or decreases the color saturation level (not valid for RGB).

### Hue

Varies the color level from +/- green to +/-blue. The red level is used as reference. This adjustment is only valid for Video and Component inputs (Not RGB).

### Sharpness

Controls the detail of the image for Video (Not for RGB and Component).

### Volume

Adjusts the sound level of the projector.

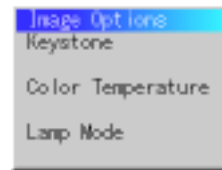


**NOTE:** You can display the volume bar without opening the menu. See “Volume Bar (Direct Button)” on page E-31 for more details.

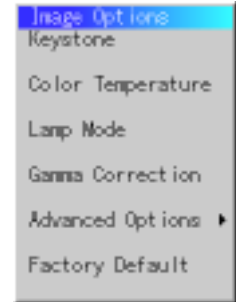
---

### Image Options

#### Basic Mode



#### Advanced Mode

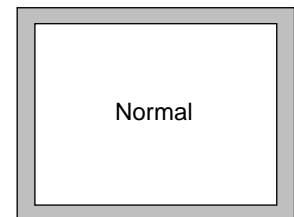
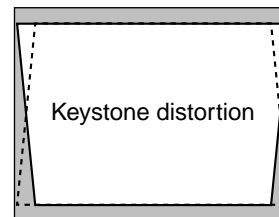


Provides optional controls such as Keystone Correction, Color Temperature and Lamp Mode. When you select Advanced Mode, the following options are available: Gamma Correction, Aspect Ratio, Noise Reduction, Color Matrix, White Balance, Auto Adjust, Position/Clock, Resolution, and Factory Default.

### Keystone



This feature corrects the keystone (trapezoidal) distortion to make the top of the screen longer or shorter to be the same as the bottom. Use the ◀ or ▶ buttons on the slide bar to correct the keystone (trapezoidal) distortion.



**NOTE:** The maximum keystone angle that can be corrected is 15 degrees upward and downward with the projector placed horizontally. However, a picture will be blurred if you correct the keystone angle beyond +12 degrees or more for SXGA signal on VT440.

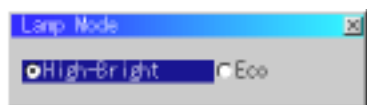
---

### Color Temperature



This feature adjusts the color temperature using the slide bar. Move the slide bar to the right to increase the color temperature for a bluish image; to the left to decrease it for a reddish image.

## Lamp Mode



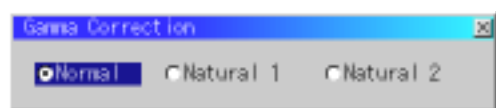
This feature enables you to select two brightness mode of the lamp: High-Bright and Eco modes. The lamp life can be extended up to 3000 hours by using the Eco mode.

High-Bright Mode: This is the default setting.

Eco Mode: Select this mode to increase the lamp life.

**NOTE:** If you have selected the Eco mode, the lamp lights in High-Bright mode for 3 minutes after the projector is turned on. After 3 minutes the lamp will change to Eco mode.

## Gamma Correction (Advanced mode)



Use the ◀ or ▶ buttons to choose “Normal” when in a lighted room and “Natural 1&2” when in a darkened room. “Natural 1” for better flesh tone; “Natural 2” for true reproduction of middle tones.

Each mode is recommended for :

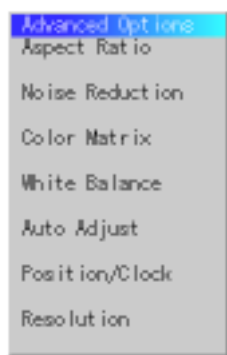
Normal: the regular picture

Natural 1: true color reproduction of natural tones

Natural 2: dark portions of a picture

## Advanced Options (Advanced mode)

Allows for adjustments of image position and stability.



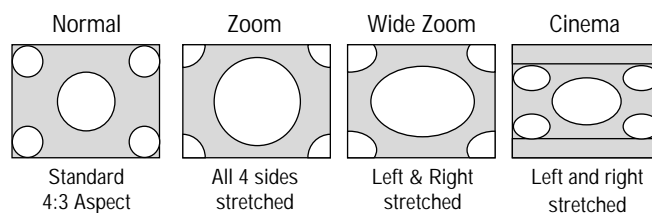
When you select Advanced Options in Advanced mode, the following options are available: Aspect Ratio, Noise Reduction, Color Matrix, White Balance, Auto Adjust, Position/Clock, Resolution, and Factory Default.

## Aspect Ratio

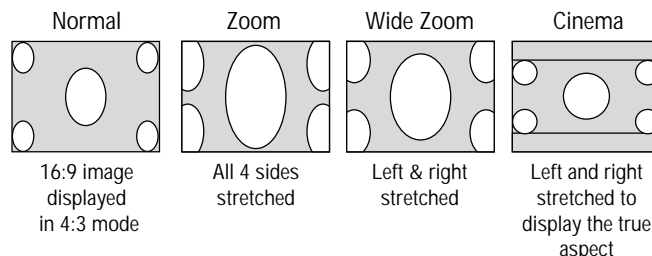


Aspect Ratio allows you to select the best Aspect mode to display your source image.

**When 4:3 is selected from the source (i.e. DVD player), the following selections will display:**



**When 16:9 is selected from the source (i.e. DVD player), the following selections will display:**



**NOTE:** Aspect Ratio is not available for “RGB”.

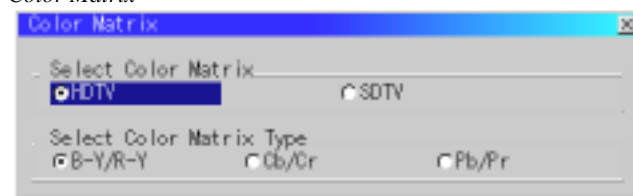
## Noise Reduction:



You can select three levels video noise reduction.

**NOTE:** The lower the Noise Reduction level, the better the image quality by way of higher video bandwidth.

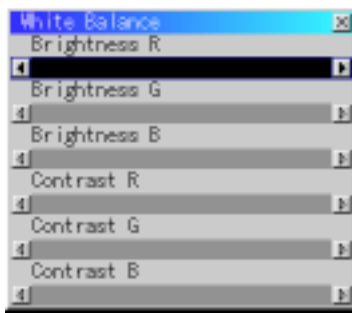
## Color Matrix



First select an appropriate color matrix to fit your component signal for HDTV or SDTV. Then select an appropriate matrix type from B-Y/R-Y, Cb/Cr or Pb/Pr.

**NOTE:** The Color Matrix feature is available for component video signal only.

White Balance:



This allows you to adjust the white balance. Brightness for each color (RGB) is used to adjust the black level of the screen; Contrast for each color (RGB) to adjust the white level of the screen.

First use the up or down buttons to select R, G, or B for the brightness and the contrast. Next use the ◀ or ▶ buttons to adjust the level.

Auto Adjust:



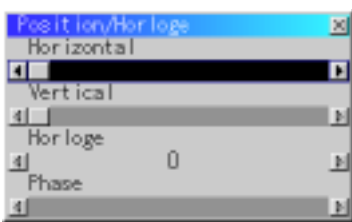
When “Auto Adjust” is set to “On”, the projector automatically determines the best resolution for the current RGB input signal to project an image using NEC’s Advanced AccuBlend Intelligent Pixel Blending Technology.

The image can be automatically adjusted for geometry and stability; “Horizontal Position”, “Vertical Position”, “Clock” and “Phase”.

On: Automatically adjusts image “Horizontal Position”, “Vertical Position”, “Clock” and “Phase”.

Off: User can adjust the image display functions (“Horizontal Position”, “Vertical Position”, “Clock” and “Phase”) manually.

Position/ Clock (when Auto Adjust is off)



This allows you to manually adjust the image horizontally and vertically, and adjust Clock and Phase.

Horizontal/Vertical Position:

Adjusts the image location horizontally and vertically using the ◀ and ▶ buttons.

This adjustment is made automatically when the Auto Adjust is turned on.

Clock: Use this item with the “Auto Adjust off” to fine tune the computer image or to remove any vertical banding that might appear. This function adjusts the clock frequencies that eliminate the horizontal banding in the image. Press the ◀ and ▶ buttons until the banding disappears. This adjustment may be necessary when you connect your computer for the first time. This adjustment is made automatically when the Auto Adjust is turned on.

Phase: Use this item to adjust the clock phase or to reduce video noise, dot interference or cross talk. (This is evident when part of your image appears to be shimmering.) Use the ◀ and ▶ buttons to adjust the image.

Use “Phase” only after the “Clock” is complete.

This adjustment is made automatically when the Auto Adjust is turned on.

Resolution (when Auto Adjust is off):



This allows you to activate or deactivate the Advanced AccuBlend feature.

Auto: Turns on the Advanced AccuBlend feature. The projector automatically reduces or enlarges the current image to fit the full screen.

Native: Turns off the Advanced AccuBlend feature. The projector displays the current image in its true resolution.

**NOTE:** While you are displaying an image with higher resolution than the projector's native resolution, even when you are in the Native mode, the image is displayed full screen using the Advanced AccuBlend feature.

### Factory Default (Advanced mode)



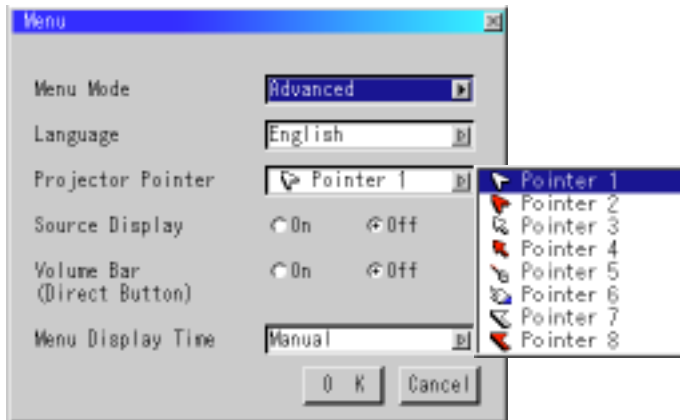
Changes all adjustments and setting to the factory preset for each source individually except Lamp Usage Hours. (To reset the lamp usage time, see “Clear Lamp Hour Meter” on page E-32.)

All Data: Reset all the adjustments and settings for all the signals to the factory preset.

Current Signal: Resets the adjustments for the current signal to the factory preset levels.

The items that can be reset are: Picture, Color Temperature, Gamma Correction, Aspect Ratio, Noise Reduction, Color Matrix, White Balance, Position/Clock and Resolution.

## Menu



Allows you to set preferences for the on-screen menu.

### Menu Mode:

This feature allows you to select two menu modes: one has basic functionality and the other more advanced functionality.

Basic Mode ..... This is the normal mode.

Advanced Mode ... This mode is used for advanced users. In this mode you can change the following settings: Gamma Correction, Aspect Ratio, Noise Reduction, Color Matrix, White Balance, Auto Adjust, Position/Clock, Resolution, Factory Default, Menu Display Time, Signal Select, Auto Start, Power Management, Power Off Confirmation and Keystone Save and Clear Lamp Hour Meter.

### Language:

You can choose one of seven languages for on-screen instructions. The options are: English, German, French, Italian, Spanish, Swedish and Japanese.

### Projector Pointer:

This enables you to select from eight different Pointer icons for the "Pointer" button on your remote control.

After moving your Pointer icon to the area you want on the screen, press the Magnify button on the remote control to enlarge the selected area on the screen. See page E-24 for more details.



**NOTE:** There may be cases where the Pointer function is not available (ex. a non-interlace signal at 15kHz such as video game.)

### Source Display:

You can turn on and off the information for input name such as VIDEO and RGB.

When this option is on, the current input will be displayed each time you switch sources or turn on the projector.

### Volume Bar (Direct Button):

This option turns on or off the volume bar when you adjust the sound volume using VOL+/- (up and down) button.

On ..... You can increase or decrease the sound volume with the volume bar on screen.

Off ..... You can increase or decrease the sound volume without having to use the volume bar.

### Menu Display Time (Advanced mode):

This option allows you to select how long the projector waits after the last touch of a button to turn off the menu.

The preset choices are "Manual", "Auto 3 sec", "Auto 10 sec", and "Auto 30 sec". The "Auto 30 sec" is the factory preset.

Manual ..... The menu can be turned off manually.

Auto 3 sec ..... The menu will automatically be turned off in 3 seconds if no buttons are pressed within 3 seconds.

Auto 10 sec ..... The menu will automatically be turned off in 10 seconds if no buttons are pressed within 10 seconds.

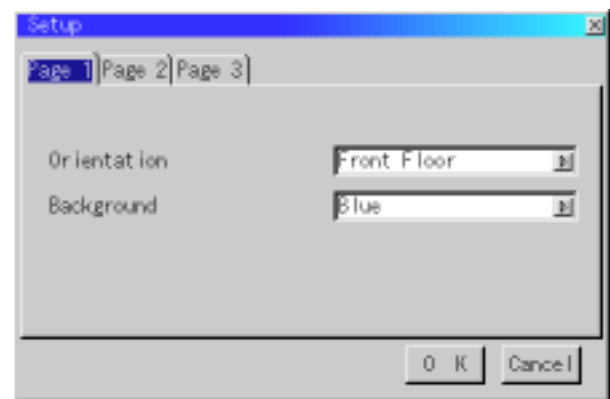
Auto 30 sec ..... The menu will automatically be turned off in 30 seconds if no buttons are pressed within 30 seconds.

## Setup

Enables you to set operating options.

Press "OK" to save your changes for all the features of Page1, Page2, and Page3.

[Page1]



### Orientation:

This reorients your image for your type of projection.

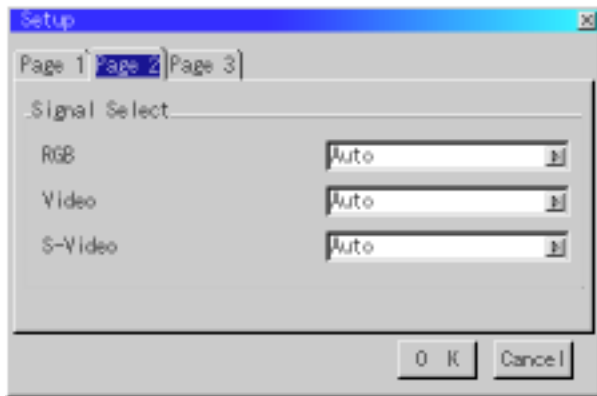
The options are: front floor projection, rear ceiling projection, rear floor projection, and front ceiling projection.

### Background:

Use this feature to display a black/ blue screen or logo when no signal is available.



[Page 2] (Advanced mode)



**Signal Select:**

<RGB>

Allows you to choose "RGB" for an RGB source such as a computer, or "Component" for a component video source such as a DVD player. Normally select "Auto" and the projector automatically detects a component signal. However there may be some component signals that the projector is unable to detect. If this is the case, select "Component".

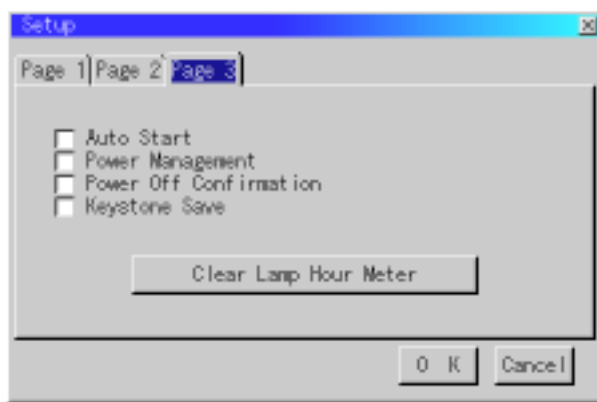
<Video & S-Video System Select>

This feature enables you to select composite video standards manually. Normally select "Auto".

When you select the video standard for Video and S-Video separately, first select the radio button and then select the video standard from the pull-down menu.

This must be done for Video and S-Video respectively.

[Page 3] (Advanced mode)



**Auto Start:**

Turns the projector on automatically when the power cable is inserted into an active power outlet. This eliminates the need to always use the "Power" button on the remote control or projector cabinet.

**Power Management:**

When this option is on and there is no RGB input for five minutes or more, the projector will automatically turn itself off.

**NOTE:** This feature does not work with Video or S-Video sources.

**Power Off Confirmation:**

This option determines whether a confirmation dialog for turning off the projector will appear or not.

**Keystone Save:**

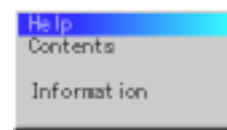
This option enables you to save your current keystone settings. Saving your change once affects all sources. The changes are saved when you turn off the projector.

**Clear Lamp Hour Meter:**

Resets the lamp clock back to zero. Pressing this button displays the "Are you sure?" confirmation dialog box. To reset the lamp usage hour meter, press "OK".

**NOTE:** The projector will turn off and go into standby mode after 2100 hours (up to 3150 hours in Eco mode) of service. If this happens, press the "Help" button on the remote control for ten seconds to reset the lamp clock back to zero. Do this only after replacing the lamp.

**Help**



**Contents**

Provides an online help about how to use the menus. An underlined link means that you can move to an adjustment item directly. Selecting the underlined link and pressing ENTER moves to the corresponding adjustment item.

**Information**

Displays the status of the current signal and lamp usage. This dialog box has four pages. The information included are as follows:

[Page 1]	[Page 3]
Source Name	Aspect Ratio
Input Terminal	Gamma Correction
Horizontal Frequency	Noise Reduction
Vertical Frequency	Color Matrix
Sync Polarity	Matrix Type
[Page 2]	[Page 4]
Signal Type	Lamp Remaining Time (%)
Video Type	Lamp Hour Meter (H)
Sync Type	Projector Usage
Interlace	
Resolution	

**NOTE:** The progress indicator shows the percentage of remaining bulb life. The value informs you of the amount of lamp and projector usage respectively.

# 4. MAINTENANCE

This section describes the simple maintenance procedures you should follow to replace the lamp, clean the filter, and replace the batteries in the remote control.

## Replacing the Lamp

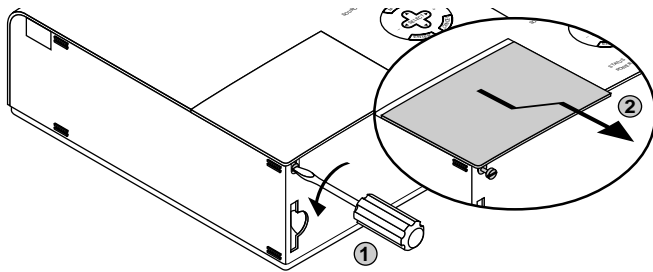
After your lamp has been operating for 2000 hours (up to 3000 hours in Eco mode) or longer, the “Status” light in the cabinet will go on and the message will appear. Even though the lamp may still be working, replace it at 2000 (up to 3000 hours in Eco mode) hours to maintain optimal projector performance.

### CAUTION

- **DO NOT TOUCH THE LAMP** immediately after it has been used. It will be extremely hot. Turn the projector off, wait 30 seconds, and then disconnect the power cable. Allow at least one hour for the lamp to cool before handling.
- **DO NOT REMOVE ANY SCREWS** except the lamp cover screw and two lamp case screws. You could receive an electric shock.
- The projector will turn off and go into stand by mode after 2100 (up to 3150 hours in Eco mode) hours of service. If this happens, be sure to replace the lamp. If you continue to use the lamp after 2000 hours (up to 3150 hours in Eco mode) of use, the lamp bulb may shatter, and pieces of glass may be scattered in the lamp case. Do not touch them as the pieces of glass may cause injury. If this happens, contact your NEC dealer for lamp replacement.

### To replace the lamp:

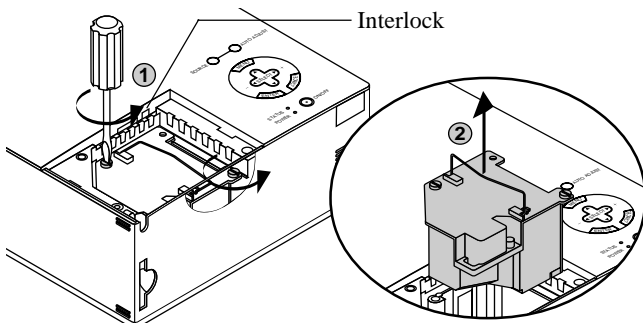
1. Loosen the lamp cover screw until the screwdriver goes into a freewheeling condition and remove the lamp cover. The lamp cover screw is not removable.



2. Loosen the two screws securing the lamp housing until the screwdriver goes into a freewheeling condition. The two screws are not removable.

Remove the lamp housing by pulling out the handle.

**NOTE:** There is an interlock on this case to prevent the risk of electrical shock. Do not attempt to circumvent this interlock.

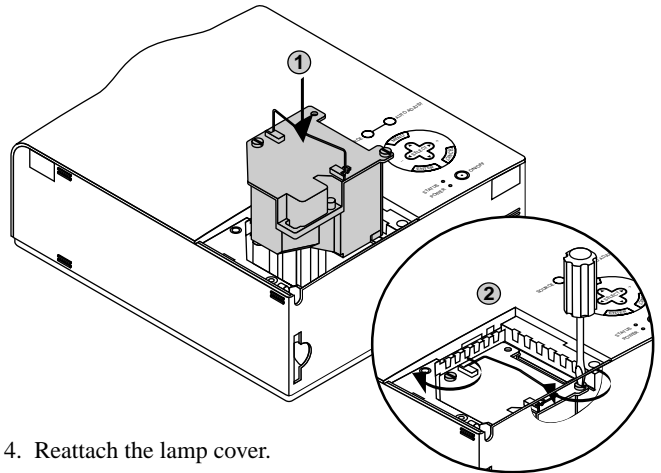


3. Insert a new lamp housing until the lamp housing is plugged into the socket.

**CAUTION:** Do not use a lamp other than the NEC replacement lamp (VT40LP).  
Order this from your NEC dealer.

Secure it in place with the two screws.

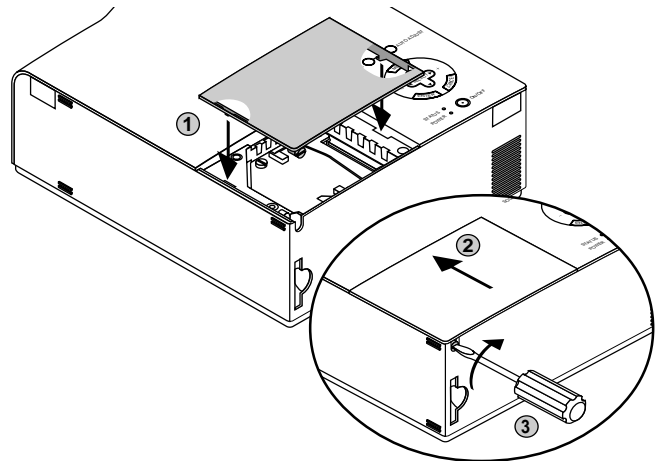
Be sure to tighten the screws.



4. Reattach the lamp cover.

Tighten the lamp cover screw.

Be sure to tighten the screw.



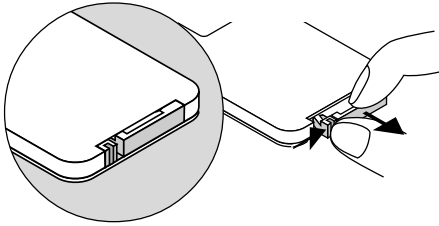
5. After you install a new lamp, select [Advanced Menu] → [Setup] → [Page 3] → [Clear Lamp Hour Meter] to reset the lamp usage hours.

**NOTE:** When the lamp exceeds 2100 hours (up to 3150 hours in Eco mode) of service, the projector cannot turn on and the menu is not displayed. If this happens, press the Help button on the remote control for a minimum of 10 seconds while in standby mode. When the lamp time clock is reset to zero, the STATUS indicator goes out.

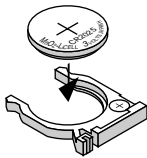
## Remote Control Battery Installation

[Wireless Card Remote Control]

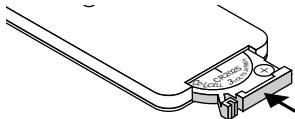
1. Press firmly and slide the battery cover off.



2. Remove the old Lithium coin cell and install new one (CR2025). Ensure that the side with a "+" is facing up.



3. Put the cover back.



## Cleaning or Replacing the Filters

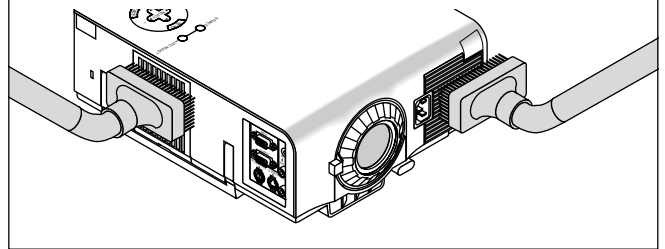
The air-filter sponge keeps the inside of the MultiSync VT440/VT540 Projector free from dust or dirt and should be cleaned after every 100 hours of operation (more often in dusty conditions). If the filter is dirty or clogged, your projector may overheat.

### CAUTION

- Turn off the power and unplug the projector before replacing the filter.
- Only clean the outside of the filter cover with a vacuum cleaner.
- Do not attempt to operate the projector without a filter cover.
- Your projector will not operate unless the filter cover is installed correctly.

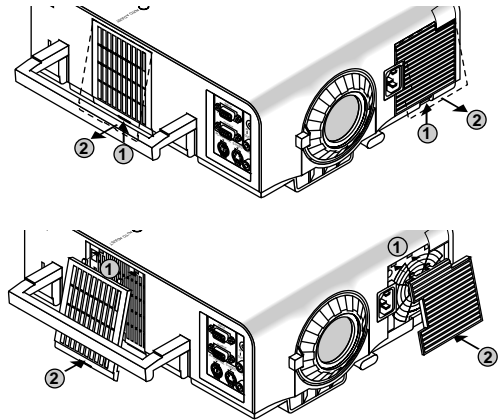
To clean the air-filter:

Vacuum the filter-through the filter cover.



To replace the air-filter:

1. Remove the filter cover by pushing up on the catch of the cover until you feel it detach.



2. Reinstall the new filter cover.

**NOTE:** Do not detach the sponge from the filter cover. Do not wash the filter cover with soap and water. Soap and water will damage the filter membrane. Before replacing the filter cover, remove dust and dirt from the projector cabinet. Keep out dust and during filter replacement.

**NOTE:** When you replace the lamp, it is also wise to replace the filter. The filter comes in the some package with your replacement lamp.

# 5. TROUBLESHOOTING

This section helps you resolve problems you may encounter while setting up or using the projector.

## Power/ Status Light Messages

Condition	Power Indicator	Status Indicator	Note
Standby	Steady orange	–	–
Cooling down	Blinking green	–	Blinks green for 30 seconds
Lamp in High-Bright mode	Steady green	–	–
Lamp in Eco mode	Steady green	Steady green	–
One minute after lamp is turned on	Blinking green	No light in High-Bright mode Blinking green in Eco mode	The message “Please wait a little” appears
Retrying to turn on lamp	Blinking green	Blinking orange	The projector retries 3 times at an interval of 15 sec for max. 45 sec)
3 minutes after lamp is turned on in Eco mode	Steady green	Blinking green	Fixed at High-Bright mode. Lamp mode can be changed on the menu
Lamp has reached its end of life (2000 hours or over)	Steady green	Steady red (High-Bright mode)/ Steady orange (Eco mode)	Message appears on screen during 2000-2100 hours of lamp usage. The projector reaches its end of life. Please replace the lamp as soon as possible
Lamp life has reached its end of life (2100 hours or over)	Steady orange	Steady red	The projector is in standby mode and cannot be turned on.
Lamp or filter cover error (3 locations)	Steady orange	Blinking red (1 sec interval)	The projector is in standby mode and cannot be turned on.
Fan error	Steady orange	Blinking red (8 sec interval)	The projector is in standby mode and cannot be turned on.
Lamp error	Steady orange	Blinking red (12 sec interval)	The projector is in standby mode and cannot be turned on.
Temperature error	Steady orange	Blinking red (4 sec interval)	The projector is in standby mode and cannot be turned on.

## Common Problems & Solutions

Problem	Check These Items
Does not turn on	<ul style="list-style-type: none"><li>• Check that the power cable is plugged in and that the power button on the projector cabinet or the remote control is on.</li><li>• Ensure that the lamp cover is installed correctly. See page E-33.</li><li>• Check to see if the projector has overheated or the lamp usage exceeds 2100 hours (3150 hours in Eco mode). If there is insufficient ventilation around the projector or if the room where you’re presenting is particularly warm, move the projector to a cooler location.</li></ul>
No picture	<ul style="list-style-type: none"><li>• Use the menu to select your source (Video, S-Video or RGB). See page E-28.</li><li>• Ensure your cables are connected properly.</li><li>• Use menus to adjust the brightness and contrast. See page E-28.</li><li>• Remove the lens cap.</li><li>• Reset the settings or adjustments to factory preset levels using the Factory Default on the Image Options Menu in Advanced mode. See page E-30.</li></ul>
Image isn’t square to the screen	<ul style="list-style-type: none"><li>• Reposition the projector to improve its angle to the screen. See page E-14.</li><li>• Use the Keystone on the Image Options Menu to correct the trapezoid distortion. See page E-28</li></ul>
Picture is blurred	<ul style="list-style-type: none"><li>• Adjust the focus. See page E-24.</li><li>• Reposition the projector to improve its angle to the screen. See page E-14.</li><li>• Ensure that the distance between the projector and screen is within the adjustment range of the lens. See page E-15.</li></ul>
Image is scrolling vertically, horizontally or both	<ul style="list-style-type: none"><li>• Use menus or Source button on the remote control or the cabinet to select the source you want to input.</li></ul>
Remote control does not work	<ul style="list-style-type: none"><li>• Install a new battery. See page E-34.</li><li>• Make sure there are no obstacles between you and the projector.</li><li>• Stand within 22 feet (7 m) of the projector. See page E-13.</li></ul>
Status indicator is lit or blinking	<ul style="list-style-type: none"><li>• See the Power/ Status Light messages above.</li></ul>
Cross color in RGB mode	<ul style="list-style-type: none"><li>• If Auto Adjust is off, turn it on. If Auto Adjust is on, turn it off and balance the image with the Position and Clock Adjust on the Advanced Options Menu. See page E-30.</li></ul>

# 6. SPECIFICATIONS

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This section provides technical information about the MultiSync VT440/VT540 Projector's performance.

## **Model Number      VT440 / VT440G / VT540 / VT540G**

### Optical

LCD Panel	0.9" p-Si TFT active-matrix, 800 × 600 dots (VT440) / 1024 × 768 dots (VT540)
Lens	Manual zoom, manual focus F2.0 – 2.3    f=35.8 – 43.0 mm
Lamp	160W NSH lamp (130W in Eco mode) The lamp is warranted for 2000 hours of operation time within 6 months.
Image Size	25 – 300 inches (0.64 – 7.62 m) diagonal
Projection Distance	3.94 – 39.04 ft (1.2 - 12.0 m)

### Electrical

Inputs	Video (NTSC / PAL / PAL60 / SECAM / NTSC4.43) Horizontal Frequency : 15 – 100 kHz (RGB : 24 kHz or over) Vertical Frequency : 50 – 117 Hz
Video Bandwidth	RGB: 80 MHz
Color	Reproduction Full color, 16.7 million colors simultaneously.
Horizontal Resolution	550 TV lines : NTSC / PAL / NTSC4.43 / YCbCr 350 TV lines : SECAM RGB    VT440 : 800 dots horizontal, 600 dots vertical VT540 : 1024 dots horizontal, 768 dots vertical
Power Requirement	100 – 120 / 200 – 240 VAC, 50 / 60 Hz
Input Current	2.7 A (100 – 120 VAC) / 1.3A (200 – 240 VAC)
Power Consumption	240 W (205 W in Eco mode)

### Mechanical

Dimensions	9.57" (W) × 4.0" (H) × 11.2" (D) / 243 mm (W) × 103 mm (H) × 284 mm (D) (not including lens and feet)
Net Weight	8.8 lbs / 3.9 kg
Environmental Considerations	Operational Temperatures: 32° – 95°F (0° to 35°C), 20 – 80% humidity (non-condensing) Storage Temperatures:    14° – 122°F (-10° to 50°C), 30 – 85% humidity
Regulations	UL Approved (UL 1950, CSA 950) Meets DOC Canada Class B requirements Meets FCC Class B requirements Meets AS/NZS3548 Class B Meets EMC Directive (EN55022, EN55082-1, EN61000-3-2, EN61000-3-3) Meets Low Voltage Directive (EN60950, TUV GS Approved)

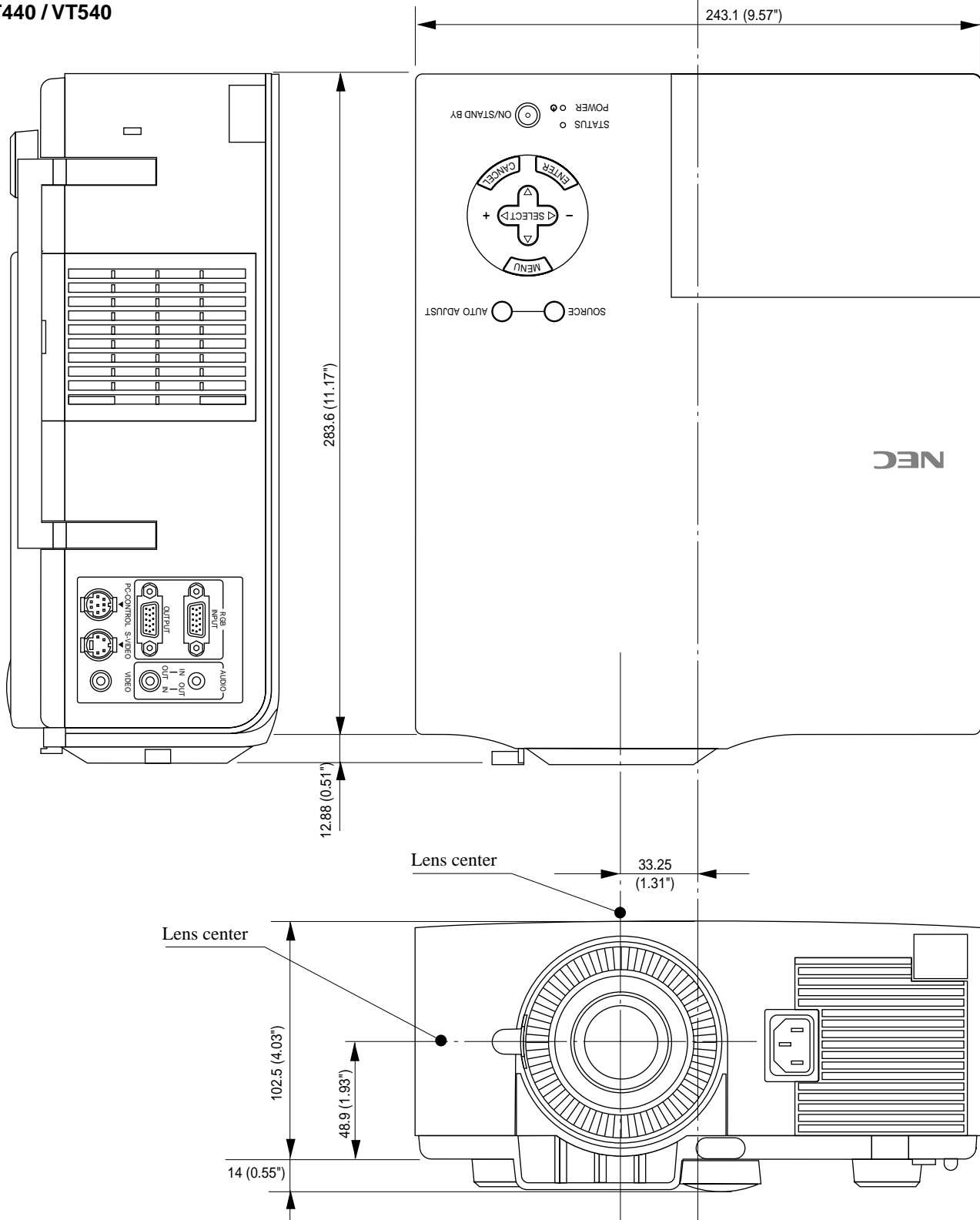


We provide more information about our projectors through the World Wide Web at <http://www.nec-pj.com/>

*The specifications are subject to change without notice.*

## Cabinet Dimensions

### VT440 / VT540

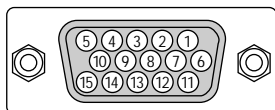


Unit = mm (inch)

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## D-Sub Pin Assignments

### Mini D-Sub 15 Pin Connector



Signal Level  
Video signal : 0.7Vp-p (Analog)  
Sync signal : TTL level

Pin No.	RGB Signal (Analog)	YCbCr Signal
1	Red	Cr
2	Green or Sync on Green	Y
3	Blue	Cb
4	Ground	
5	Ground	
6	Red Ground	Cr Ground
7	Green Ground	Y Ground
8	Blue Ground	Cb Ground
9	No Connection	
10	Sync Signal Ground	
11	Ground	
12	Bi-directional DATA (SDA)	
13	Horizontal Sync or Composite Sync	
14	Vertical Sync	
15	Data Clock	

## Timing Chart

Y / N	Signal	Resolution ( Dots )	Refresh Rate ( Hz )	Frequency H. ( kHz )	Dot Clock ( MHz )
Y	NTSC	640 × 480	60	15.734	-
Y	PAL	768 × 576	50	15.625	-
Y	SECAM	768 × 576	50	15.625	-
Y	VESA	640 × 480	59.94	31.47	25.175
Y	IBM	640 × 480	60	31.47	25.175
Y	MAC	640 × 480	60	31.47	25.175
Y	MAC	640 × 480	66.67	34.97	31.334
Y	MAC	640 × 480	66.67	35	30.24
Y	VESA	640 × 480	72.81	37.86	31.5
Y	VESA	640 × 480	75	37.5	31.5
Y	IBM	640 × 480	75	39.375	31.49
Y	VESA	640 × 480	85.01	43.269	36
Y	IBM	720 × 350	70.09	31.469	28.322
Y	VESA	720 × 400	85.04	37.927	35.5
Y	IBM	720 × 350	87.85	39.44	35.5
Y	IBM	720 × 400	87.7	39.375	35.5
Y	VESA	800 × 600	56.25	35.16	36
Y	VESA	800 × 600	60.32	37.879	40
Y	VESA	800 × 600	72.19	48.077	50
Y	VESA	800 × 600	75	46.88	49.5
Y	VESA	800 × 600	85.06	53.674	56.25
#Y	MAC	832 × 624	74.55	49.725	57.283
#Y	VESA	1024 × 768	43 Interlaced	35.5	44.9
#Y	VESA	1024 × 768	60	48.363	65
#Y	VESA	1024 × 768	70.07	57.476	75
#Y	IBM	1024 × 768	72.03	58.131	79
#Y	MAC	1024 × 768	74.93	60.241	80
#Y	VESA	1024 × 768	75.03	60.023	78.75
#Y	VESA	1024 × 768	85	68.677	94.5
##Y	VESA	1152 × 864	75	67.5	108
##Y	MAC	1152 × 870	75.06	68.681	100
##Y	SUN	1152 × 900	65.95	61.796	92.94
##Y	SGI	1152 × 900	76.05	71.736	105.6
##Y	VESA	1280 × 960	60	60	108
##Y	SGI	1280 × 1024	60	63.9	107.35
##Y	VESA	1280 × 1024	60.02	63.981	108
##Y	MAC	1280 × 1024	60.38	64.31	107
##Y	MAC	1280 × 1024	65.2	69.9	118.5
##Y	HP	1280 × 1024	72.01	78.125	135
##Y	SUN	1280 × 1024	76.11	81.13	135
##Y	VESA	1280 × 1024	75.03	79.976	135
##Y	VESA	1280 × 1024	85.02	91.146	157.5
##Y	HDTV (1080i)	1920 × 1080	60 Interlace	33.75	74.25
##Y	HDTV (720p)	1280 × 720	60 Progressive	45	74.25
##Y	SDTV (480p)	720 × 483	59.94 Progressive	31.47	27

#Y: Images in above flagged with # and Y are compressed with Advanced AccuBlend on VT440.

##Y: Images in above flagged with ## and Y are compressed with Advanced AccuBlend on VT540.

**NOTE1:** Some composite sync signals may not be displayed correctly.

**NOTE2:** Signals other than those specified in the table above may not be displayed correctly. If this should happen, change the refresh rate or resolution on your PC. Refer to Display Properties help section of your PC for procedures.



## PC Control Codes

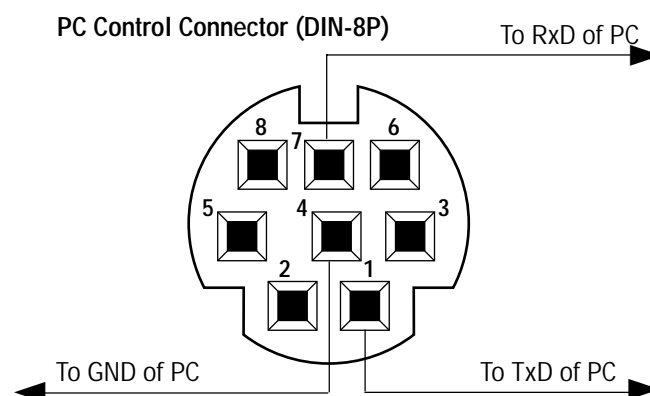
Function	Code Data
POWER ON	02H 00H 00H 00H 00H 02H
POWER OFF	02H 01H 00H 00H 00H 03H
INPUT SELECT RGB	02H 03H 00H 00H 02H 01H 01H 09H
INPUT SELECT VIDEO	02H 03H 00H 00H 02H 01H 06H 0EH
INPUT SELECT S-VIDEO	02H 03H 00H 00H 02H 01H 0BH 13H
PICTURE MUTE ON	02H 10H 00H 00H 00H 12H
PICTURE MUTE OFF	02H 11H 00H 00H 00H 13H
SOUND MUTE ON	02H 12H 00H 00H 00H 14H
SOUND MUTE OFF	02H 13H 00H 00H 00H 15H
ON SCREEN MUTE ON	02H 14H 00H 00H 00H 16H
ON SCREEN MUTE OFF	02H 15H 00H 00H 00H 17H

**NOTE:** Contact your local dealer for a full list of the PC Control Codes if needed.

## Cable Connection

### Communication Protocol

<b>Baud rate:</b>	<b>38400 bps</b>
<b>Data length:</b>	<b>8 bits</b>
<b>Parity:</b>	<b>No parity</b>
<b>Stop bit:</b>	<b>One bit</b>
<b>X on/off:</b>	<b>None</b>
<b>Communications procedure:</b>	<b>Full duplex</b>



**NOTE:** Pins 2, 3, 5, 6 and 8 are used inside the projector.

**NEC**